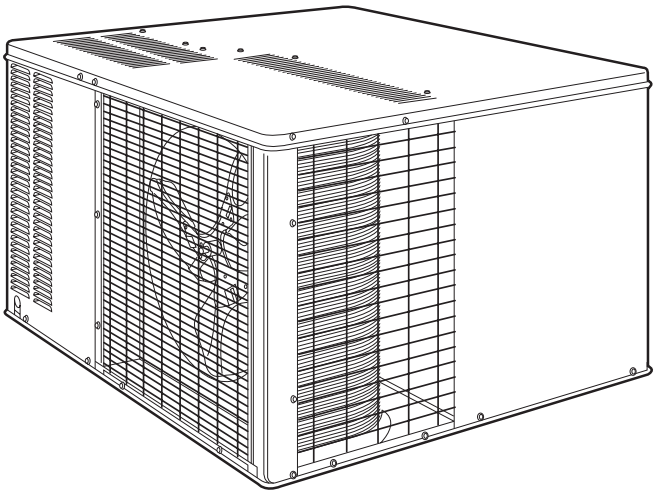
Product Data

50HS Single-Package Heat Pumps

1½ to 5 Nominal Tons



Single-Package Heat Pump for Manufactured Housing/Residential and Light Commercial use.

Features/Benefits

One-piece heat pumps with optional electric heaters, low installation costs, dependable performance, and easy maintenance

Easy installation

Factory-assembled package is a compact, fully self-contained, heat pump unit that is prewired, prepiped, and precharged for minimum installation expense.

50HS units are available in a variety of standard sizes with voltage options to meet residential and light commercial requirements. Unit is installed easily on a rooftop or a ground-level pad. The optional base rail unit provides an elevated base.

Convertible duct configuration on the 50HS is designed for easy use in either downflow or horizontal discharge applications.

Efficient operation

High-efficiency design with SEERs (Seasonal Energy Efficiency Ratios) up to 10.1 and HSPFs (Heating Seasonal Performance Factors) of up to 7.0.

Durable, dependable components

Compressors are designed for high efficiency. Each compressor is hermetically sealed against contamination to help promote longer life and dependable operation. Vibration isolation provides quiet operation. Reciprocating or scroll compressors are used. Compressors have internal high-pressure and overcurrent protection.

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Direct-drive multispeed, PSC (permanent split capacitor) blower motor is standard on all models.

Direct-drive, PSC condenser-fan motors are designed to help reduce energy consumption and provide for cooling operation down to 40 F.

Refrigerant system is designed to provide dependability. Liquid refrigerant strainers are used to promote clean, unrestricted operation. Each unit leaves the factory with a full refrigerant charge. Refrigerant service connections make checking operating pressures easier.

A fixed metering device controls refrigerant flow precisely.

Protection devices include a suction line accumulator that keeps liquid refrigerant from reaching the compressor and a crankcase heater to keep compressor oil warm for optimum lubrication. This equipment is not required or included on units using scroll compressors.

Solid-state Time Guard® circuit protects the compressor by preventing potentially damaging too-rapid cycling.

Evaporator and condenser coils are computer-designed for optimum heat transfer and cooling efficiency. Condenser coil is fabricated of copper tube and aluminum fins and is located inside the unit to protect against damage and ensure long life and reliable operation. The condenser coil is protected by a rubber-coated, metal grille.

Copper fin coils are also available by special order. These coils are recommended in applications where aluminum fins are likely to be destroyed due to corrosion. They are ideal for seacoast applications.

Chronotemp™ defrost system provides time/temperature-based defrost cycles to maintain unit efficiency. This highly reliable system checks for coil icing conditions at preset time intervals and initiates a defrost cycle only if required. The defrost cycle ends as soon as defrosting is accomplished.

Weatherized cabinets are constructed of heavy-duty, phosphated, zinc-coated prepainted steel capable of withstanding 500 hours in salt spray. Interior surfaces of the indoor compartment are insulated with foil-faced fiberglass to help keep the conditioned air from being affected by the outdoor ambient temperature and to provide improved air quality. Unit insulation conforms to American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) No. 62P. Sloped condensate pan permits an external drain.

Low sound ratings ensure a quiet indoor and outdoor environment with sound ratings as low as 7.8 bels.

Easy to service cabinets provide easy accessibility to serviceable components during installation and maintenance. Rounded corners are an important safety feature. A high-quality finish ensures an attractive appearance.

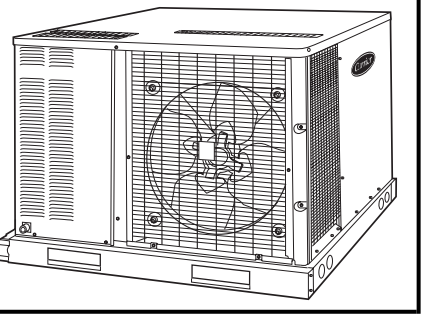
Round duct connections provide easy installation for manufactured housing.

Compact size enables the unit to be located where space is limited.

Downflow-only option is shipped from factory for vertical ductwork connection and requires no conversion.

Optional base rail provides holes for rigging and handling as well as an elevated mounting frame that gives additional structural support to horizontal installations.

UNIT WITH OPTIONAL BASE RAIL



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Model number nomenclature

50HS 024 3 1 1 AA

Model No.
50HS — Single Package Heat Pump

Nominal Cooling Capacity
018 — 1 1/2 Tons
024 — 2 Tons
030 — 2 1/2 Tons
036 — 3 Tons
042 — 3 1/2 Tons
048 — 4 Tons
060 — 5 Tons

V-Ph-Hz
3 — 208/230-1-60
5 — 208/230-3-60
6 — 460-3-60

Series

Packaging

Options
AA — Base Rail
AB — Downflow with Base Rail

ARI* capacities

COOLING AND HEATING CAPACITIES AND EFFICIENCIES

UNIT 50HS	NOMINAL TONS	STANDARD CFM	NET COOLING† CAPACITIES AT 95 F (Btuh)	SEER†	NET HEATING† CAPACITIES AT 47 F (Btuh)	COP† (at 47 F Btuh)	NET HEATING† CAPACITIES (at 17 F Btuh)	COP† (at 17 F Btuh)	HSPF	SOUND RATINGS** (Bels)
018	1½	675	19,000	10.0	17,800	2.9	9,300	1.7	6.6	7.8
024	2	750	24,000	10.0	23,600	2.9	12,000	1.8	6.7	8.0
030	2½	1000	29,000	10.0	29,400	3.0	15,000	1.8	6.8	8.0
036	3	1270	35,600	10.1	35,400	3.1	17,400	1.8	6.8	8.0
042	3½	1420	42,000	10.0	40,000	3.0	20,000	1.9	6.8	8.2
048	4	1575	47,000	10.1	47,500	3.1	27,200	2.0	7.0	8.2
060	5	1995	57,500	10.0	57,000	3.2	32,000	2.0	7.0	8.2

LEGEND

Bels — Sound Levels (1 bel = 10 decibels)
COP — Coefficient of Performance
DOE — Department of Energy
HSPF — Heating Seasonal Performance Factor
SEER — Seasonal Energy Efficiency Ratio

*Air Conditioning & Refrigeration Institute.

†Rated in accordance with ARI Standard 210/240-89 and/or U.S. Government DOE test procedures.
**Rated in accordance with ARI Standard 270-84.

OUTDOOR SOUND: ONE-THIRD OCTAVE BAND DATA — DECIBELS

FREQ. Hz	UNIT 50HS						
	018	**024**	**030**	**036**	**042**	**048**	**060**
63	40.1	49.6	46.8	47.6	50.0	53.2	54.3
125	55.2	60.1	61.3	62.1	64.7	65.4	65.1
250	64.9	70.1	70.5	70.4	70.4	74.5	71.5
500	65.3	68.3	69.2	69.0	69.9	74.3	72.7
1000	71.2	72.6	74.1	72.2	75.3	75.2	73.9
2000	69.0	69.4	70.0	71.1	73.8	72.6	73.4
4000	64.7	67.8	68.9	70.3	75.1	68.6	71.7
8000	59.8	60.9	64.0	63.9	69.2	61.2	66.3

Physical data

UNIT 50HS	018	024	030	036	042	048	060
REFRIGERANT	R-22						
Refrigerant Control*	Acutrol™ System						
SHIPPING WEIGHT (lb)							
Without Base Rails	233	256	268	288	359	359	373
With Optional Base Rails	268	276	288	308	379	379	393
COMPRESSOR TYPE	Reciprocating	Reciprocating	Reciprocating	Reciprocating	Reciprocating	Scroll	Scroll
INDOOR FAN	Centrifugal — Direct Drive						
Speeds	2	3	3	3	3	2	2
Rpm (High Speed)	825	1025	1025	1100	1100	1100	1100
Diameter (in.)	10	10	10	10	10	10	11
Width (in.)	9	9	9	9	10	9	9
Nominal Airflow (Cfm)	675	800	1000	1300	1400	1600	1995
Motor Hp	¼	¼	¼	½	¾	¾	1
INDOOR COIL							
Rows...Fins/in.	3...15	3...15	3...15	3...15	3...15	3...15	4...15
Face Area (sq ft)	1.80	2.30	3.00	2.70	4.50	4.50	4.50
OUTDOOR FAN	Propeller — Direct Drive						
Cfm	1700	1900	1900	1900	1900	2400	2400
Rpm	850	1050	850	1050	1050	1050	1050
Diameter (in.)	18	18	18	18	20	20	20
Motor Hp	⅛	¼	¼	¼	¼	⅓	⅓
OUTDOOR COIL							
Rows...Fins/in.	2...17	2...17	2...17	2...17	2...17	2...17	2...17
Face Area (sq ft)	5.7	5.7	5.7	6.7	8.2	8.2	8.2
FILTER SIZE (in.)†							
Throwaway	20 x 20	20 x 20	20 x 24	24 x 24	24 x 30	24 x 30	24 x 30

*Operating charge listed on unit nameplate.
†Recommended field-supplied filters are 1 in. thick.

Options and accessories

Options

Unit with base rail provides holes for rigging and handling as well as an elevated mounting frame that gives additional structural support for horizontal installations.

Downflow option provides for easy vertical ductwork connections. Unit is equipped with base rail.

Accessories

ACCESSORY	
Roof Curb	8 in.
	11 in.
	14 in.
Manual Outdoor-Air Damper	
Filter Rack	
Duct Cover Kit	
Rectangular Duct Connection Kit	
Outdoor Thermostat	
Thermostat and Subbase	
Low-Pressure Switch Kit	
High-Pressure Switch Kit	
Low-Ambient Kit	
Electric Heat with Single-Point Kit (5.0 to 20.0 kW)	

Factory-assembled roof curbs are designed for use on downflow discharge applications. Heavy gage, galvanized steel construction provides one-piece support. The curb complies with the standards of the NRCA (National Roofing Contractors Association). A wood nailing strip is provided for attaching the roofing to the curb.

Manual outdoor-air damper provides for minimum outdoor air and is manually adjustable to different positions.

Thermostat and subbase provide heating and cooling unit control. The subbase provides system and fan switching at the thermostat location.

Electronic programmable thermostat provides 2-stage heating and 2-stage cooling control with remote communication ability.

Low-ambient kit (Motormaster® II device) allows the use of mechanical cooling down to outdoor ambient temperatures as low as 0° F.

Electric heaters provide heat in the unit when required. Each package has a heater module that slides into keyed mounting slots in the fan inlet. Heater sizes range from 5.0 to 20.0 kW. An available single-point power supply for the entire unit results in lower installed costs.

High- and low-pressure switches provide additional safety features and protect the unit from running at unsuitable pressures.

Filter rack features easy installation, serviceability, and high filtering performance.

Duct cover kit covers horizontal ducts after unit has been converted to downflow discharge.

Rectangular duct connection kit allows easy conversion from round to rectangular ducts.

Outdoor thermostat allows for staging of electric heaters based on outdoor-air temperatures.

Dimensions

SIZES 018-036 WITHOUT BASE RAIL

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT		CORNER WT (Lb/Kg)				UNIT HEIGHT (in./mm)	DIMENSION (in./mm)
		Lb	Kg	A	B	C	D	E	F
50HS018	208/230-1-60	233	106	66/30	45/20	95/43	42/19	24.1/613	18.2/462
50HS024	208/230-1-60	256	117	68/31	46/21	97/44	45/20	24.1/613	18.2/462
50HS030	208/230-1-60, 208/230-3-60	268	122	66/30	58/26	91/41	53/24	24.1/613	18.2/462
50HS036	208/230-1-60, 208/230-3-60, 460-3-60	288	131	71/32	63/29	96/44	58/26	28.1/714	22.2/563

UNIT	CENTER OF GRAVITY (in./mm)		
	X	Y	Z
50HS018	20.7/525	19.2/487	10.6/270
50HS024	20.4/517	19.3/491	10.6/270
50HS030	20.3/515	20.1/510	10.6/270
50HS036	20.1/511	20.2/513	12.4/314

REQ'D CLEARANCES FOR SERVICING — in. (mm)
Indoor Coil Access Side 30 (762)
Control Box Access Side 30 (762)
(Except for NEC requirements)
Unit Top 36 (914)
Side Opposite Ducts 30 (762)

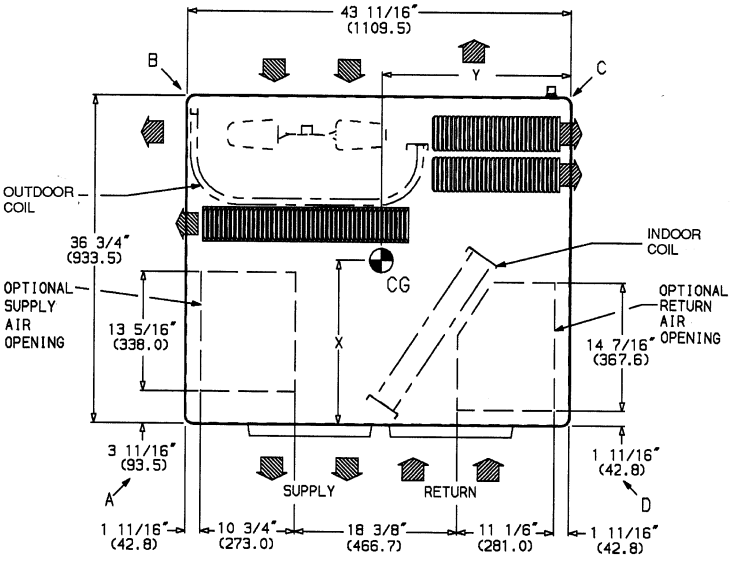
REQ'D CLEARANCES TO COMBUSTIBLE MAT'L — in. (mm)
Unit Top 0
Duct Side of Unit 0
Side Opposite Ducts 0
Bottom of Unit 0
Vertical Discharge, First 12 in. (305) of Supply Duct 1 (25)

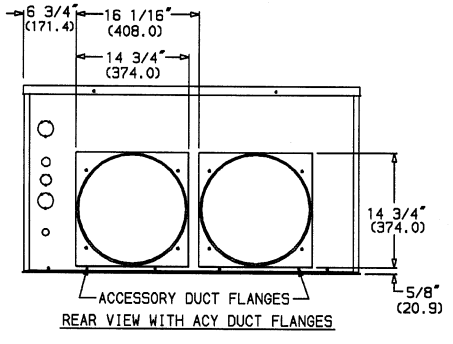
NEC REQ'D CLEARANCES — in. (mm)
Between Units, Control Box Side 42 (1067)
Unit and Ungrounded Surfaces, Control Box Side 36 (914)
Unit and Block or Concrete Walls and Other
Grounded Surfaces, Control Box Side 42 (1067)

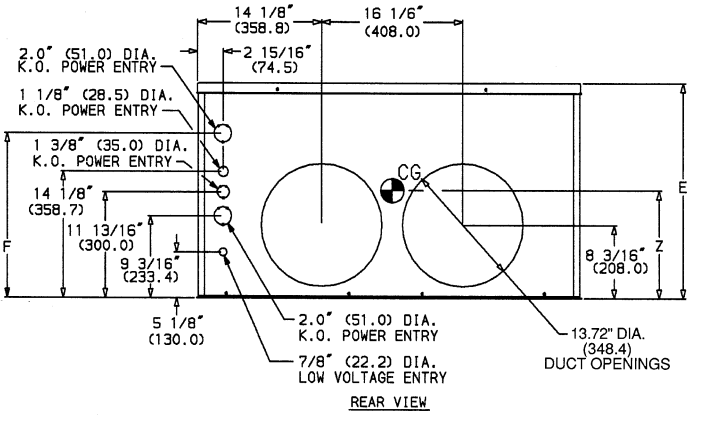
LEGEND

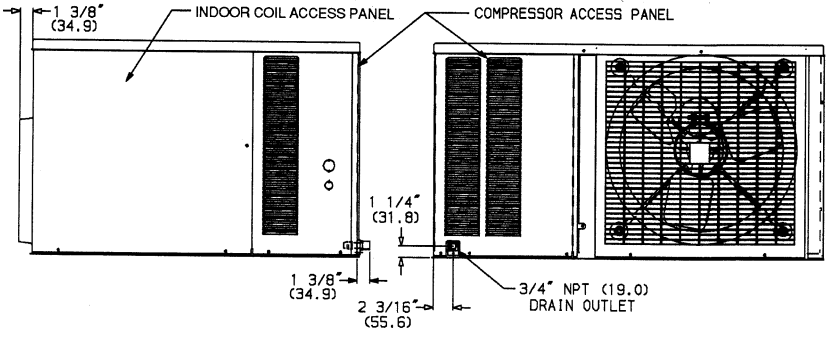
CG — Center of Gravity
MAT'L — Material
NEC — National Electrical Code
REQ'D — Required

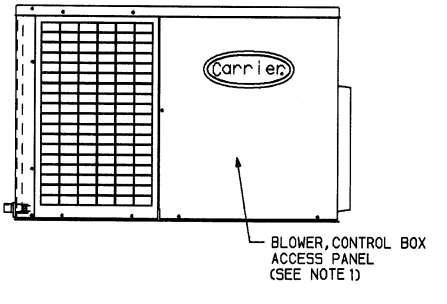
NOTES:
1. Clearances must be maintained to prevent recirculation of air from outdoor-fan discharge.
2. Dimensions in ( ) are in mm.











Dimensions (cont)

SIZES 018-036 WITH OPTIONAL BASE RAIL

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT		CORNER WT (Lb/Kg)				UNIT HEIGHT (in./mm)	DIMENSION (in./mm)
		Lb	Kg	A	B	C	D	E	F
50HS018	208/230-1-60	268	122	70/32	50/23	100/45	48/22	27.43/697	21.50/546
50HS024	208/230-1-60	276	125	73/33	51/23	102/46	50/23	27.43/697	21.50/546
50HS030	208/230-1-60, 208/230-3-60	288	131	71/32	63/29	96/44	58/26	27.43/697	21.50/546
50HS036	208/230-1-60, 208/230-3-60, 460-3-60	308	140	76/35	68/31	101/46	63/29	31.43/798	25.50/648

UNIT	CENTER OF GRAVITY (in./mm)		
	X	Y	Z
50HS018	20.4/518	19.4/493	12.9/329
50HS024	20.2/513	19.5/495	12.9/329
50HS030	20.1/511	20.2/513	12.9/329
50HS036	20.0/508	20.3/515	14.7/373

REQ'D CLEARANCES FOR SERVICING — in. (mm)
Indoor Coil Access Side 30 (762)
Control Box Access Side 30 (762)
(Except for NEC requirements)
Unit Top 36 (914)
Side Opposite Ducts 30 (762)

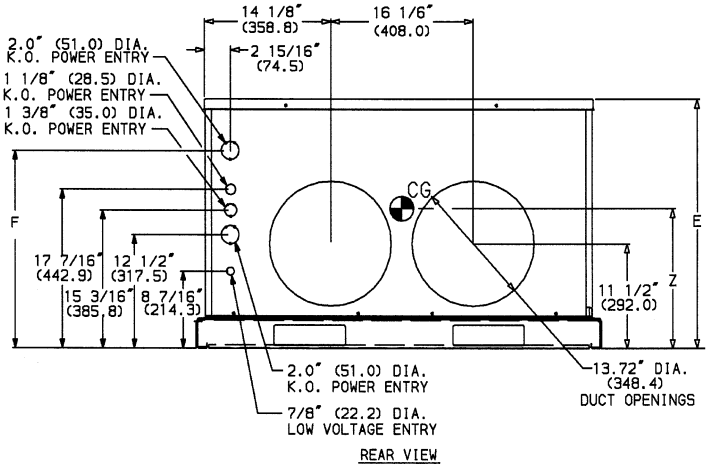
REQ'D CLEARANCES TO COMBUSTIBLE MAT'L — in. (mm)
Unit Top 0
Duct Side of Unit 0
Side Opposite Ducts 0
Bottom of Unit 0
Vertical Discharge, First 12 in. (305) of Supply Duct 1 (25)

NEC REQ'D CLEARANCES — in. (mm)
Between Units, Control Box Side 42 (1067)
Unit and Ungrounded Surfaces, Control Box Side 36 (914)
Unit and Block or Concrete Walls and Other
Grounded Surfaces, Control Box Side 42 (1067)

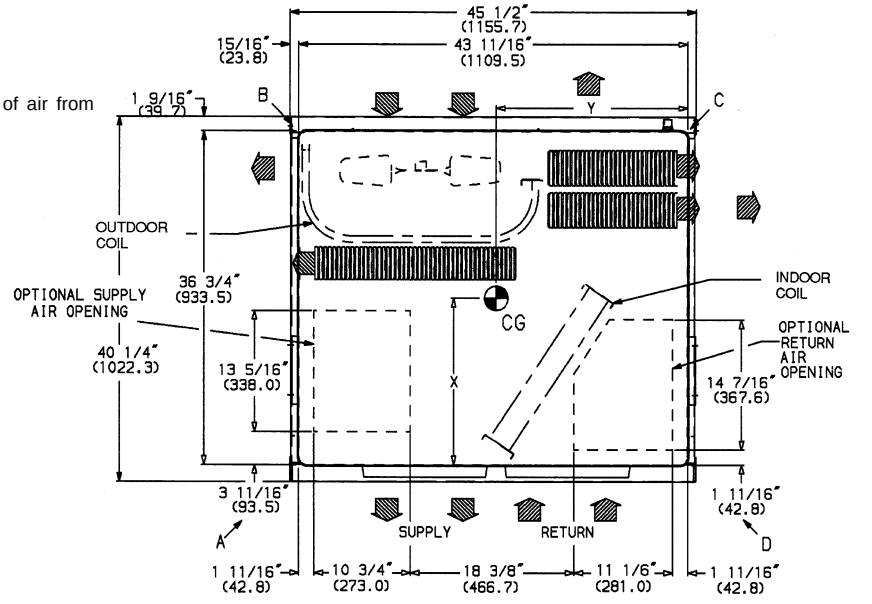
LEGEND

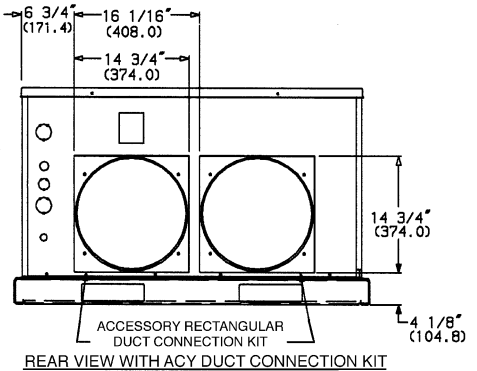
CG — Center of Gravity
MAT'L — Material
NEC — National Electrical Code
REQ'D — Required

NOTES:
1. Clearances must be maintained to prevent recirculation of air from outdoor-fan discharge.
2. Dimensions in ( ) are in mm.

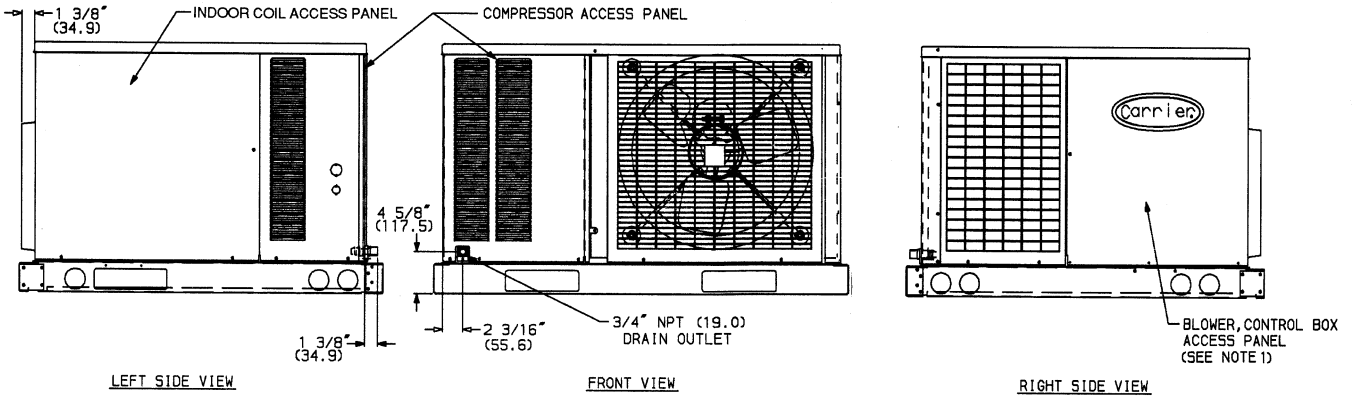


REAR VIEW





REAR VIEW WITH ACY DUCT CONNECTION KIT



LEFT SIDE VIEW — FRONT VIEW — RIGHT SIDE VIEW

SIZES 042-060 WITHOUT BASE RAIL

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT		CORNER WT (Lb/Kg)			
		Lb	Kg	A	B	C	D
50HS042,048	208/230-1-60, 208/230-3-60, 460-3-60	359	163	89/40	81/37	113/51	76/35
50HS060	208/230-1-60, 208/230-3-60, 460-3-60	373	170	92/42	85/39	116/53	80/36

UNIT	CENTER OF GRAVITY (in./mm)		
	X	Y	Z
50HS042,048	19.7/500	20.5/522	15.0/381
50HS060	19.7/499	20.6/523	15.0/381

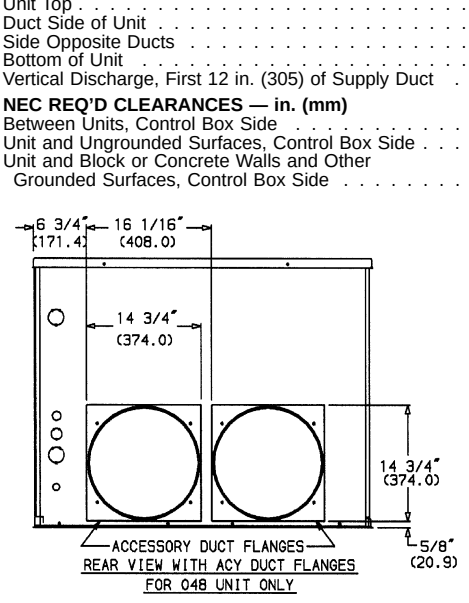
REQ'D CLEARANCES FOR SERVICING — in. (mm)
Indoor Coil Access Side 30 (762)
Control Box Access Side 30 (762)
(Except for NEC requirements)
Unit Top 36 (914)
Side Opposite Ducts 30 (762)

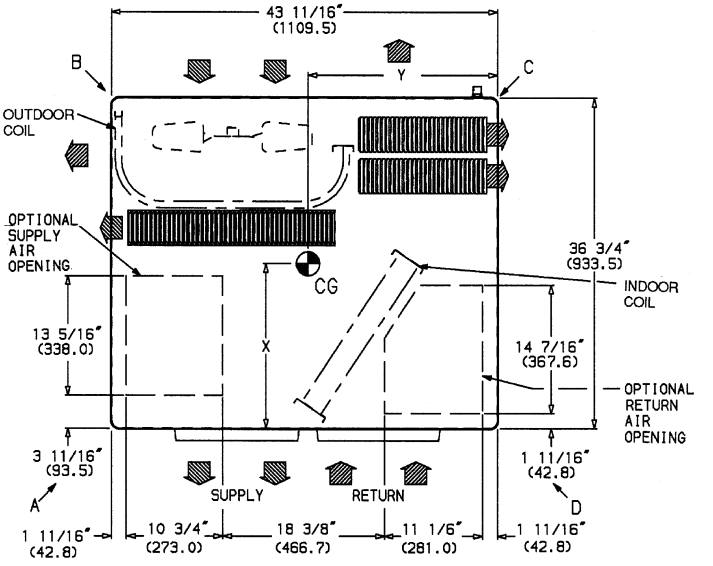
REQ'D CLEARANCES TO COMBUSTIBLE MAT'L — in. (mm)
Unit Top 0
Duct Side of Unit 0
Side Opposite Ducts 0
Bottom of Unit 0
Vertical Discharge, First 12 in. (305) of Supply Duct 1 (25)

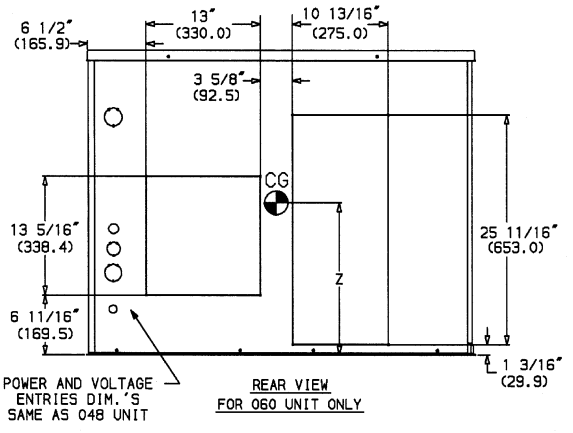
NEC REQ'D CLEARANCES — in. (mm)
Between Units, Control Box Side 42 (1067)
Unit and Ungrounded Surfaces, Control Box Side 36 (914)
Unit and Block or Concrete Walls and Other
Grounded Surfaces, Control Box Side 42 (1067)

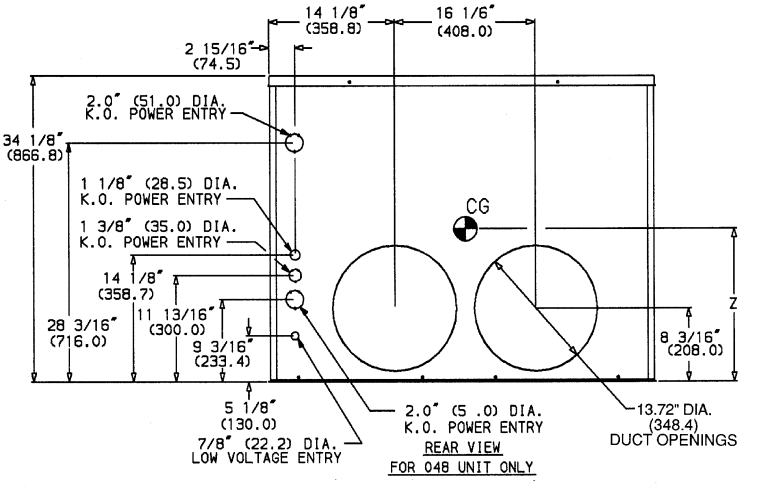
LEGEND
CG — Center of Gravity
MAT'L — Material
NEC — National Electrical Code
REQ'D — Required

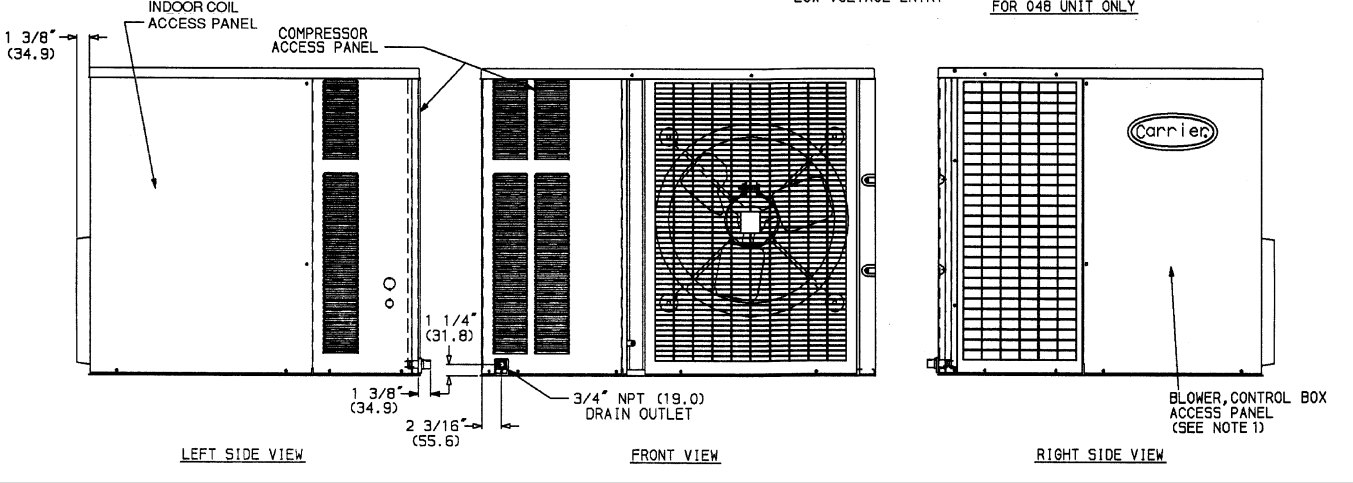
NOTES:
1. Clearances must be maintained to prevent recirculation of air from outdoor-fan discharge.
2. Dimensions in ( ) are in mm.











Dimensions (cont)

SIZES 042-060 WITH OPTIONAL BASE RAIL

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT		CORNER WT (Lb/Kg)			
		Lb	Kg	A	B	C	D
50HS042,048	208/230-1-60, 208/230-3-60, 460-3-60	379	172	94/43	86/39	118/54	81/37
50HS060	208/230-1-60, 208/230-3-60, 460-3-60	393	179	97/44	90/41	121/55	85/39

UNIT	CENTER OF GRAVITY (in./mm)		
	X	Y	Z
50HS042,048	19.6/498	20.6/524	17.3/440
50HS060	19.6/497	20.6/524	17.3/440

REQ'D CLEARANCES FOR SERVICING — in. (mm)
Indoor Coil Access Side 30 (762)
Control Box Access Side (Except for NEC requirements) 30 (762)
Unit Top 36 (914)
Side Opposite Ducts 30 (762)

REQ'D CLEARANCES TO COMBUSTIBLE MAT'L — in. (mm)
Unit Top 0
Duct Side of Unit 0
Side Opposite Ducts 0
Bottom of Unit 0
Vertical Discharge, First 12 in. (305) of Supply Duct 1 (25)

NEC REQ'D CLEARANCES — in. (mm)
Between Units, Control Box Side 42 (1067)
Unit and Ungrounded Surfaces, Control Box Side 36 (914)
Unit and Block or Concrete Walls and Other Grounded Surfaces, Control Box Side 42 (1067)

LEGEND

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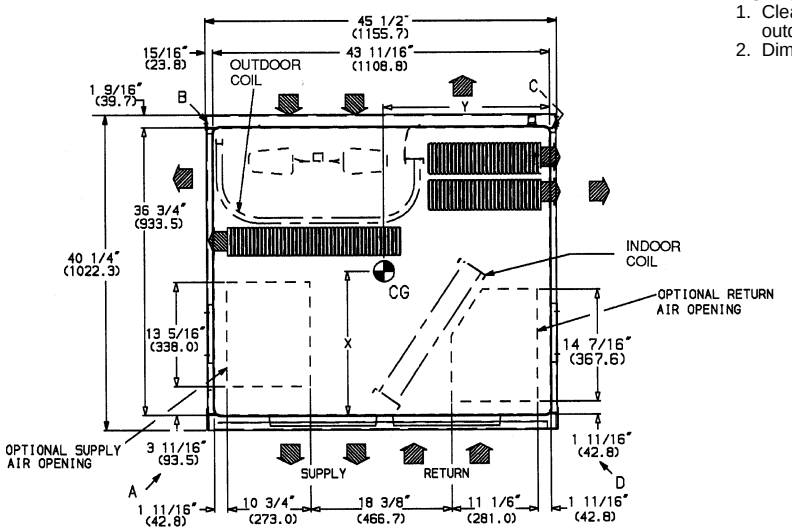
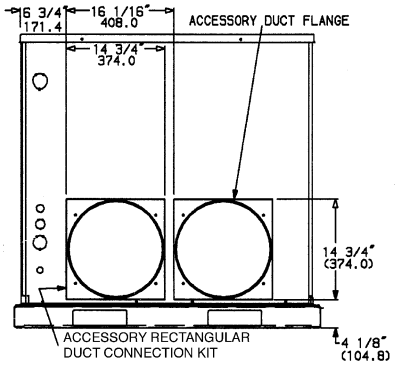
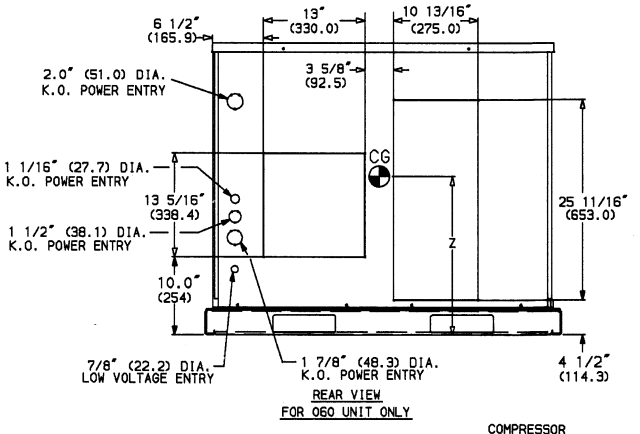
NOTES:
1. Clearances must be maintained to prevent recirculation of air from outdoor-fan discharge.
2. Dimensions in ( ) are in mm.

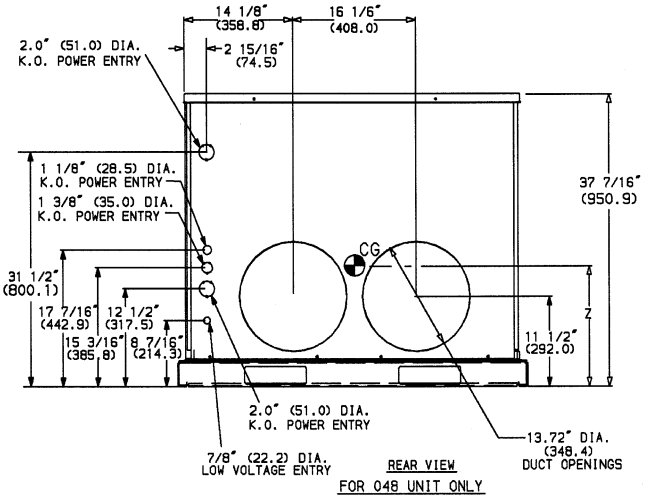




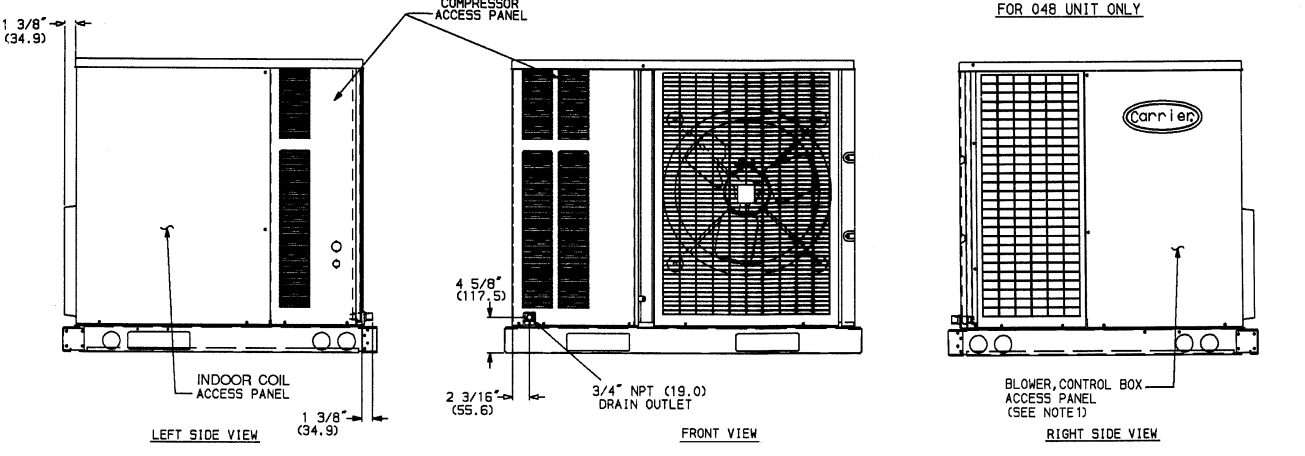
REAR VIEW WITH ACY DUCT CONNECTION KIT FOR 048 UNIT ONLY



REAR VIEW FOR 060 UNIT ONLY

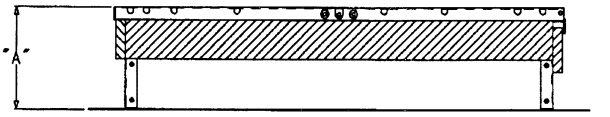


REAR VIEW FOR 048 UNIT ONLY

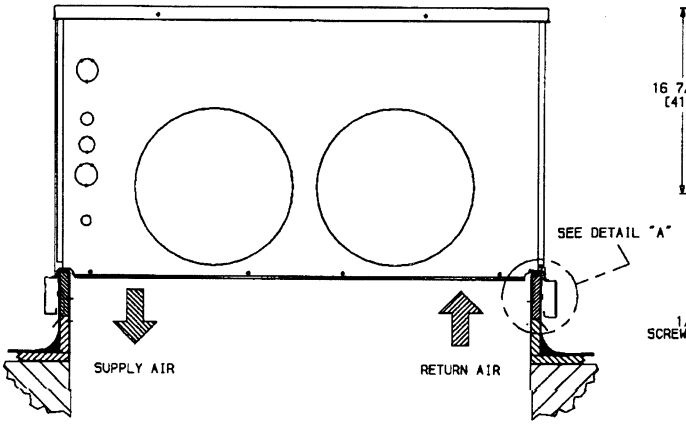


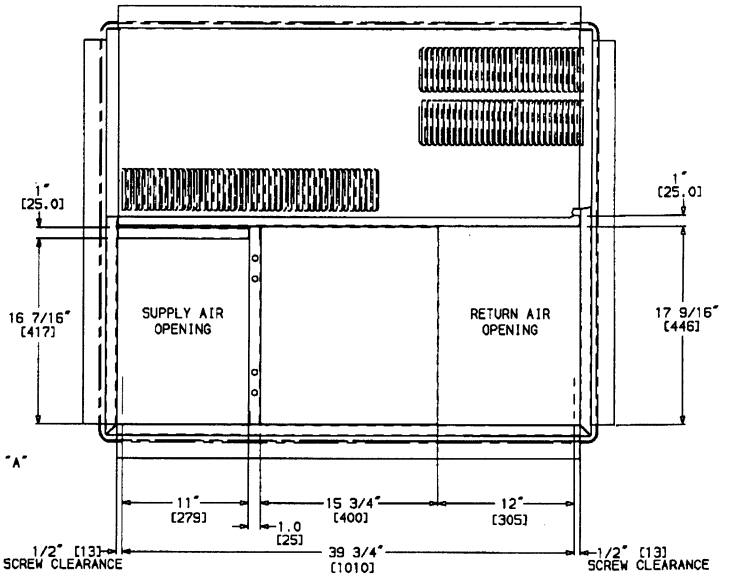
ROOF CURB, SIZES 018-060

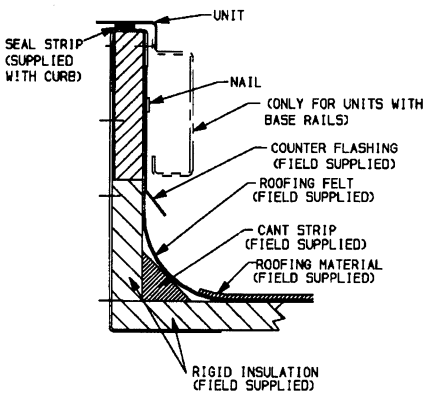
	PART NUMBER	"A"
Flat	CPRFCURB001A01	8″ [203]
	CPRFCURB002A01	11″ [279]
	CPRFCURB003A01	14″ [356]



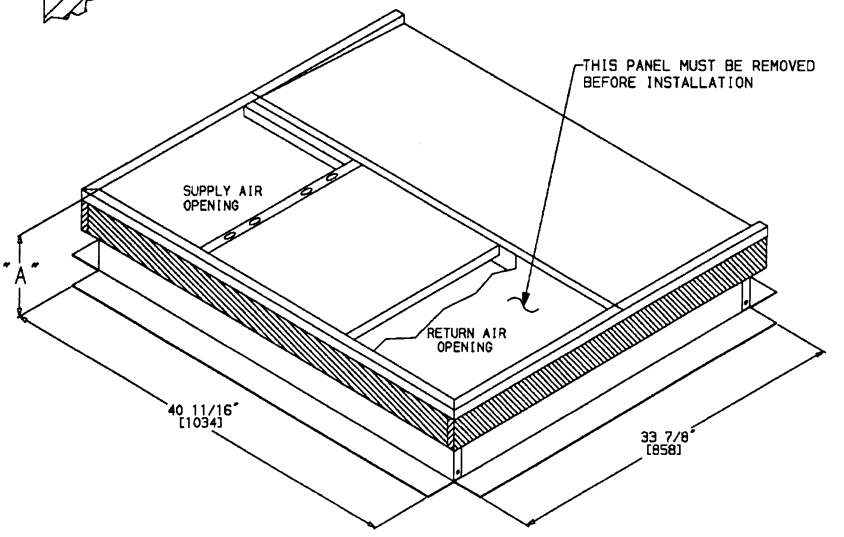
NOTES:
1. Roof curb must be set up for unit being installed.
2. Seal strip must be applied as required for unit being installed.
3. Dimensions in [ ] are in millimeters.
4. Roof curb is made of 16 gage steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance 4 ft on each side.
7. Direction of airflow.
8. Insulated panels: 1-in. thick fiberglass, 1-lb density.







DETAIL "A"



Selection procedure

I Determine cooling and heating requirements at design conditions.

Given:

Required Cooling Capacity (TC) . . . . . 28,000 Btuh
Sensible Heat Capacity (SHC) . . . . . 20,500 Btuh
Required Heating Capacity . . . . . 28,550 Btuh
Outdoor Entering-Air Temperature . . . . . 95 F
Outdoor-Air Winter Design Temperature . . . . . 20 F
Indoor-Air Winter Design Temperature . . . . . 70 F
Indoor Entering-Air Temperature . . . . . 80 F edb, 67 F ewb
Indoor-Air Quantity . . . . . 1125 cfm
External Static Pressure . . . . . 0.40 in. wg
Electrical Characteristics (V-Ph-Hz) 230-1-60

edb — entering dry bulb
ewb — entering wet bulb

II Select unit based on required cooling capacity.

Enter Cooling Capacities table at outdoor entering-air temperature of 95 F, indoor air entering at 1125 cfm and 67 F ewb (entering wet bulb). The 50HS030 unit will provide a total cooling capacity of 29,300 Btuh and a sensible heat capacity of 22,100 Btuh.

For indoor-air temperature other than 80 F edb (entering dry bulb), calculate sensible heat capacity correction, as required, using the formula found in Note 3 following the cooling capacities tables.

NOTE: Unit ratings are net capacities.

III Select electric heat.

Enter the unit 50HS030 Heating Capacities table at 1125 cfm. At 70 F return indoor air and 20 F air entering outdoor coil, the integrated heating capacity is 14,900 Btuh. (Select integrated heating capacity value since deductions for outdoor-coil frost and defrosting have already been made. No correction is required.)

The required heating capacity is 28,550 Btuh. Therefore, 13,650 Btuh (28,550 – 14,900) additional electric heat is required.

Determine additional electric heat capacity in kW.

$$\frac{13{,}650 \text{ Btuh}}{3414 \text{ Btuh/kW}} = 4.0 \text{ kW of heat required}$$

Enter the Electric Heater Packages table on page 19 for 208/240 v, single-phase, 50HS030 unit. The 5-kW heater at 240 v most closely satisfies the heating required. To calculate kW at 230 v, multiply the heater kW by multiplication factor 0.92 found in the Multiplication Factors table on page 21.

5 kW x 0.92 = 4.6 kW
4.6 x 3414 = 15,704 Btuh

To calculate kW at 208 v, see Electric Heater Packages table on page 19.

Total unit heating capacity is 30,604 Btuh (14,900 + 15,704).

IV Determine fan speed and power requirements at design conditions.

Before entering the air delivery tables, calculate the total static pressure required. From the given, the Accessory Electric Heat Pressure Drop table, Wet Coil Pressure Drop table, and the Filter Pressure Drop table, find:

External static pressure	0.40 in. wg
Filter	0.11 in. wg
Electric heat	0.04 in. wg
Wet coil	0.11 in. wg
Total static pressure	0.66 in. wg

Enter the table for Dry Coil Air Delivery — Horizontal Discharge at 1125 cfm and 230-v high speed. By interpolation, the standard motor will deliver 0.66 in. wg static pressure. This will adequately handle job requirements.

Performance data

COOLING CAPACITIES

50HS018 (1½ TONS)

Temp (F) Air Ent Outdoor Coil (edb)		Indoor Entering Air — Cfm/BF											
		525/0.05				675/0.07				750/0.07			
		Indoor Entering Air — Ewb (F)											
		72	67	63*	62	72	67	63*	62	72	67	63*	62
85	TC	21.7	19.6	17.9	17.2	22.3	20.3	18.7	18.0	22.2	20.5	18.8	18.3
	SHC	10.0	12.8	12.3	15.1	10.8	14.2	13.8	17.1	10.9	14.9	14.5	17.9
	kW	1.94	1.90	1.86	1.85	2.01	1.97	1.93	1.92	2.03	2.01	1.97	1.96
95	TC	20.8	18.4	16.7	16.0	21.4	19.0	17.3	16.8	21.5	19.2	17.5	17.1
	SHC	9.78	12.3	11.8	14.5	10.6	13.8	13.3	16.5	10.9	14.6	14.0	17.1
	kW	2.07	2.01	1.96	1.95	2.14	2.09	2.04	2.04	2.17	2.13	2.08	2.08
105	TC	19.5	17.0	15.4	14.7	20.1	17.6	15.9	15.6	20.2	17.8	16.1	16.1
	SHC	9.36	11.8	11.2	13.9	10.3	13.4	12.7	15.6	10.6	14.1	13.4	16.1
	kW	2.19	2.12	2.07	2.05	2.27	2.20	2.15	2.15	2.30	2.24	2.18	2.19
115	TC	18.1	15.6	14.1	13.5	18.7	16.1	14.5	14.6	18.8	16.3	14.6	15.0
	SHC	8.89	11.3	10.7	13.3	9.83	12.8	12.2	14.6	10.2	13.6	12.8	15.0
	kW	2.31	2.23	2.16	2.15	2.39	2.31	2.25	2.26	2.42	2.35	2.28	2.31

50HS024 (2 TONS)

Temp (F) Air Ent Outdoor Coil (edb)		Indoor Entering Air — Cfm/BF											
		700/0.04				800/0.05				900/0.06			
		Indoor Entering Air — Ewb (F)											
		72	67	63*	62	72	67	63*	62	72	67	63*	62
85	TC	28.6	25.2	23.0	21.9	29.1	25.7	23.5	22.4	29.5	26.0	23.8	22.7
	SHC	13.0	16.2	15.6	19.3	13.6	17.3	16.7	20.7	14.1	18.3	17.6	21.9
	kW	2.66	2.58	2.51	2.49	2.72	2.64	2.57	2.55	2.77	2.69	2.62	2.61
95	TC	26.9	23.6	21.4	20.4	27.4	24.0	21.8	20.8	27.7	24.3	22.1	21.2
	SHC	12.4	15.6	15.0	18.6	13.0	16.7	16.0	19.9	13.5	17.7	16.9	21.0
	kW	2.79	2.70	2.63	2.61	2.85	2.76	2.69	2.67	2.90	2.82	2.74	2.73
105	TC	25.2	21.9	19.8	18.8	25.6	22.2	20.1	19.3	25.9	22.5	20.4	19.9
	SHC	11.9	15.0	14.4	17.9	12.5	16.1	15.3	19.1	13.0	17.0	16.3	19.9
	kW	2.92	2.82	2.73	2.72	2.98	2.88	2.80	2.78	3.04	2.93	2.85	2.86
115	TC	23.4	20.1	18.2	17.4	23.8	20.5	18.4	18.0	24.0	20.6	18.6	18.6
	SHC	11.3	14.4	13.7	17.1	11.9	15.4	14.7	18.0	12.5	16.4	15.6	18.6
	kW	3.04	2.93	2.83	2.82	3.11	2.99	2.89	2.90	3.16	3.04	2.95	2.97

50HS030 (2½ TONS)

Temp (F) Air Ent Outdoor Coil (edb)		Indoor Entering Air — Cfm/BF											
		875/0.05				1000/0.06				1125/0.06			
		Indoor Entering Air — Ewb (F)											
		72	67	63*	62	72	67	63*	62	72	67	63*	62
85	TC	34.1	30.5	27.9	26.8	34.5	31.0	28.5	27.4	34.9	31.4	28.8	27.8
	SHC	16.0	20.3	19.6	24.2	16.6	21.6	20.8	25.9	17.2	22.8	22.0	27.3
	kW	3.24	3.17	3.11	3.09	3.31	3.24	3.17	3.16	3.37	3.31	3.24	3.23
95	TC	32.3	28.6	26.1	25.1	32.8	29.0	26.5	25.6	33.1	29.3	26.8	26.1
	SHC	15.4	19.6	18.8	23.4	16.1	20.9	20.1	25.0	16.7	22.1	21.2	26.1
	kW	3.43	3.34	3.27	3.25	3.49	3.41	3.34	3.33	3.56	3.48	3.40	3.40
105	TC	30.2	26.5	24.2	23.3	30.7	26.9	24.6	23.9	31.0	27.1	24.8	24.6
	SHC	14.7	18.8	18.1	22.5	15.5	20.1	19.3	23.8	16.1	21.3	20.4	24.6
	kW	3.59	3.49	3.40	3.39	3.66	3.56	3.48	3.47	3.73	3.63	3.55	3.56
115	TC	27.9	24.4	22.3	21.5	28.3	24.7	22.5	22.3	28.6	24.9	22.7	23.0
	SHC	14.0	18.0	17.3	21.5	14.8	19.3	18.4	22.3	15.5	20.5	19.6	23.0
	kW	3.74	3.62	3.52	3.51	3.81	3.70	3.60	3.61	3.88	3.77	3.67	3.71

50HS036 (3 TONS)

Temp (F) Air Ent Outdoor Coil (edb)		Indoor Entering Air — Cfm/BF											
		1050/0.10				1300/0.13				1500/0.14			
		Indoor Entering Air — Ewb (F)											
		72	67	63*	62	72	67	63*	62	72	67	63*	62
85	TC	40.1	36.8	33.9	33.1	40.8	37.7	34.9	34.4	41.4	38.2	35.5	35.3
	SHC	19.8	25.4	24.6	30.4	20.9	27.9	27.0	33.4	22.0	29.6	28.8	35.3
	kW	3.80	3.70	3.62	3.59	3.92	3.83	3.76	3.74	4.03	3.93	3.87	3.86
95	TC	38.2	34.6	31.7	31.1	38.8	35.6	32.6	32.4	39.7	36.1	33.1	33.4
	SHC	19.2	24.6	23.6	29.3	20.4	27.1	26.1	32.1	21.8	29.0	27.8	33.4
	kW	4.02	3.90	3.80	3.77	4.15	4.04	3.95	3.94	4.28	4.15	4.05	4.07
105	TC	36.1	32.4	29.6	29.1	36.9	33.3	30.4	30.5	37.1	33.7	30.8	31.6
	SHC	18.5	23.7	22.7	28.2	20.0	26.3	25.1	30.5	20.8	28.1	26.8	31.6
	kW	4.25	4.09	3.97	3.94	4.39	4.24	4.12	4.13	4.48	4.35	4.23	4.27
115	TC	33.8	30.1	27.5	27.2	34.6	30.9	28.1	28.7	34.8	31.2	28.5	29.7
	SHC	17.7	22.8	21.8	27.0	19.3	25.3	24.1	28.7	20.3	27.1	25.8	29.7
	kW	4.46	4.28	4.14	4.12	4.62	4.43	4.29	4.32	4.71	4.54	4.40	4.47

50HS042 (3½ TONS)

Temp (F) Air Ent Outdoor Coil (edb)		Indoor Entering Air — Cfm/BF											
		1225/0.07				1400/0.08				1575/0.09			
		Indoor Entering Air — Ewb (F)											
		72	67	63*	62	72	67	63*	62	72	67	63*	62
85	TC	51.9	47.3	43.4	42.6	52.8	48.7	44.7	43.8	53.8	49.5	45.6	44.9
	SHC	25.6	32.4	37.2	38.2	26.5	34.6	40.0	41.1	28.0	36.6	42.3	43.4
	kW	4.50	4.37	4.24	4.21	4.58	4.49	4.37	4.34	4.70	4.59	4.47	4.44
95	TC	49.5	44.7	41.0	40.2	50.4	46.0	42.2	41.4	51.3	46.7	43.0	42.5
	SHC	24.8	31.4	36.0	37.0	25.8	33.6	38.8	39.8	27.3	35.6	41.0	41.7
	kW	4.77	4.61	4.46	4.43	4.85	4.73	4.59	4.56	4.98	4.83	4.70	4.68
105	TC	46.7	42.1	38.6	37.8	47.6	43.1	39.6	39.0	48.5	43.8	40.5	40.2
	SHC	23.8	30.3	34.8	35.8	24.8	32.5	37.5	38.4	26.4	34.5	39.4	39.9
	kW	5.02	4.84	4.68	4.64	5.10	4.96	4.80	4.77	5.23	5.07	4.92	4.91
115	TC	43.8	39.3	36.1	35.5	44.6	40.3	37.1	36.7	45.5	40.9	38.1	37.9
	SHC	22.8	29.3	33.6	34.3	23.8	31.4	36.1	36.7	25.5	33.4	37.6	37.9
	kW	5.25	5.06	4.88	4.85	5.34	5.18	5.01	4.99	5.47	5.29	5.14	5.13

LEGEND

BF — Bypass Factor
Edb — Entering Dry-Bulb
Ewb — Entering Wet-Bulb
kW — Total Unit Power Input
Ldb — Leaving Dry-Bulb
Lwb — Leaving Wet-Bulb
SHC — Sensible Heat Capacity (1000 Btuh) Net
TC — Total Capacity (1000 Btuh) Net

***At 75 F entering dry bulb (Tennessee Valley Authority [TVA] rating conditions); all others at 80 F entering dry bulb.**

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
Below 80 F edb, subtract (corr factor x cfm) from SHC.
Above 80 F edb, add (corr factor x cfm) to SHC.
Correction Factor = 1.10 x (1 − BF) x (edb − 80).

Performance data (cont)

COOLING CAPACITIES (cont)

50HS048 (4 TONS)

Temp (F) Air Ent Outdoor Coil (edb)		Indoor Entering Air — Cfm/BF											
		1400/0.06				1600/0.07				1800/0.08			
		Evap Air — Ewb (F)											
		72	67	63*	62	72	67	63*	62	72	67	63*	62
85	TC	52.9	48.4	44.9	44.0	53.9	49.3	45.7	44.9	54.2	49.8	46.2	45.8
	SHC	26.3	33.8	32.8	40.8	27.6	36.1	34.9	43.6	28.5	38.0	36.9	45.7
	kW	4.82	4.75	4.70	4.68	4.94	4.86	4.82	4.79	5.04	4.97	4.93	4.90
95	TC	50.8	46.3	42.7	41.9	51.7	47.0	43.3	42.8	52.1	47.6	43.8	44.0
	SHC	25.6	33.1	31.8	39.7	26.9	35.2	33.9	42.4	28.0	37.3	35.9	44.0
	kW	5.30	5.23	5.18	5.15	5.43	5.34	5.29	5.27	5.53	5.45	5.40	5.38
105	TC	48.5	43.9	40.5	39.7	49.2	44.5	41.0	40.9	49.7	45.0	41.5	42.0
	SHC	24.8	32.1	30.9	38.6	26.1	34.3	32.9	40.9	27.3	36.4	34.9	42.0
	kW	5.83	5.76	5.68	5.66	5.96	5.87	5.80	5.79	6.07	5.99	5.91	5.92
115	TC	46.0	41.4	38.2	37.6	46.7	41.9	38.6	38.9	47.0	42.3	39.0	40.0
	SHC	24.1	31.1	29.9	37.5	25.3	33.3	31.9	38.9	26.5	35.4	33.8	40.0
	kW	6.42	6.32	6.22	6.20	6.54	6.44	6.34	6.35	6.65	6.55	6.46	6.48

50HS060 (5 TONS)

Temp (F) Air Ent Outdoor Coil (edb)		Indoor Entering Air — Cfm/BF											
		1750/0.03				2000/0.04				2250/0.04			
		Evap Air — Ewb (F)											
		72	67	63*	62	72	67	63*	62	72	67	63*	62
85	TC	66.3	59.8	55.3	53.6	67.3	60.6	56.1	54.7	67.8	61.1	56.6	56.2
	SHC	32.8	42.1	40.8	51.0	34.5	45.0	43.5	54.4	35.8	47.7	46.1	56.2
	kW	6.12	5.98	5.87	5.85	6.27	6.12	6.02	5.99	6.40	6.25	6.15	6.15
95	TC	63.4	56.8	52.3	50.8	64.2	57.5	53.0	52.5	64.7	57.9	53.4	53.9
	SHC	31.8	41.0	39.6	49.7	33.5	44.0	42.3	52.3	34.9	46.6	44.9	53.9
	kW	6.71	6.55	6.45	6.42	6.86	6.68	6.59	6.56	6.98	6.82	6.73	6.73
105	TC	60.2	53.8	49.5	48.2	60.9	54.4	50.0	49.9	61.3	54.8	50.3	51.3
	SHC	30.9	40.0	38.4	48.2	32.4	42.8	41.1	49.8	33.9	45.5	43.6	51.3
	kW	7.34	7.17	7.06	7.03	7.48	7.31	7.20	7.21	7.61	7.44	7.34	7.39
115	TC	56.8	50.7	46.6	46.0	57.5	51.1	47.0	47.5	57.8	51.4	47.2	48.8
	SHC	29.6	38.8	37.2	45.9	31.3	41.7	39.9	47.5	32.9	44.4	42.4	48.8
	kW	8.00	7.86	7.72	7.72	8.17	7.99	7.86	7.90	8.29	8.13	8.00	8.08

LEGEND

BF — Bypass Factor
Edb — Entering Dry-Bulb
Ewb — Entering Wet-Bulb
kW — Total Unit Power Input
Ldb — Leaving Dry-Bulb
Lwb — Leaving Wet-Bulb
SHC — Sensible Heat Capacity (1000 Btuh) Net
TC — Total Capacity (1000 Btuh) Net

***At 75 F entering dry bulb (Tennessee Valley Authority [TVA] rating conditions); all others at 80 F entering dry bulb.**

NOTES:
1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used:

$$t_{ldb} = t_{edb} - \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

t_{lwb} = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h_{lwb})

$$h_{lwb} = h_{ewb} - \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: h_{ewb} = Enthalpy of air entering evaporator coil

3. The SHC is based on 80 F edb temperature of air entering evaporator coil. Below 80 F edb, subtract (corr factor x cfm) from SHC. *Above 80 F edb, add (corr factor x cfm) to SHC.*
   Correction Factor = 1.10 x (1 − BF) x (edb − 80).

HEATING CAPACITIES

50HS018 (1½ TONS)

Temp (F) Air Ent Indoor Coil	Indoor Air Cfm (std)		Air Temp Entering Outdoor Coil (F db at 70% rh)																	
			−10		0		10		17		20		30		40		47		50		60	
60	525	Cap.	2.83	2.83	5.33	5.33	7.83	7.39	9.58	8.74	10.30	9.32	12.80	11.20	15.90	15.20	18.00	18.00	19.00	19.00	22.50	22.50
		kW	1.37		1.43		1.49		1.53		1.55		1.61		1.68		1.73		1.75		1.83	
	675	Cap.	2.99	2.99	5.57	5.57	8.16	7.69	9.96	9.09	10.70	9.68	13.30	11.70	16.50	15.80	18.70	18.70	19.70	19.70	23.20	23.20
		kW	1.43		1.48		1.53		1.57		1.58		1.63		1.69		1.73		1.75		1.80	
	750	Cap.	3.06	3.06	5.67	5.67	8.29	7.82	10.10	9.23	10.90	9.83	13.50	11.80	16.70	16.00	19.00	19.00	20.00	20.00	23.40	23.40
		kW	1.46		1.51		1.55		1.59		1.60		1.65		1.70		1.74		1.76		1.80	
70	525	Cap.	2.30	2.30	4.75	4.75	7.20	6.80	8.92	8.13	9.65	8.70	12.10	10.60	15.00	14.40	17.10	17.10	18.10	18.10	21.50	21.50
		kW	1.38		1.45		1.52		1.57		1.59		1.66		1.74		1.79		1.82		1.90	
	675	Cap.	2.44	2.44	4.98	4.98	7.52	7.10	9.30	8.48	10.10	9.07	12.60	11.00	15.70	15.00	17.80	17.80	18.90	18.90	22.40	22.40
		kW	1.44		1.50		1.56		1.60		1.62		1.68		1.75		1.80		1.82		1.88	
	750	Cap.	2.55	2.55	5.11	5.11	7.67	7.23	9.46	8.62	10.20	9.22	12.80	11.20	15.90	15.20	18.10	18.10	19.10	19.10	22.70	22.70
		kW	1.47		1.53		1.59		1.63		1.64		1.70		1.76		1.81		1.83		1.89	
80	525	Cap.	1.74	1.74	4.14	4.14	6.55	6.19	8.23	7.51	8.95	8.07	11.40	9.95	14.20	13.60	16.20	16.20	17.20	17.20	20.50	20.50
		kW	1.37		1.45		1.52		1.57		1.59		1.66		1.74		1.79		1.82		1.90	
	675	Cap.	1.88	1.88	4.37	4.37	6.87	6.49	8.61	7.85	9.36	8.44	11.90	10.40	14.80	14.20	16.90	16.90	17.90	17.90	21.30	21.30
		kW	1.44		1.51		1.59		1.64		1.66		1.73		1.81		1.86		1.88		1.95	
	750	Cap.	1.97	1.97	4.49	4.49	7.00	6.61	8.76	7.99	9.52	8.58	12.00	10.50	15.00	14.40	17.10	17.10	18.20	18.20	21.70	21.70
		kW	1.47		1.54		1.61		1.66		1.68		1.75		1.82		1.87		1.89		1.96	

LEGEND

Cap. — Heating Capacity (1000 Btuh) (Includes Indoor-Fan Motor Heat)
db — Dry Bulb
kW — Total Power Input (Includes Compressor Motor Power Input, Outdoor-Fan Motor Input, and Indoor-Fan Motor Input)
rh — Relative Humidity

NOTES:

1. ▭ indicates integrated ratings.
2. Integrated capacity is maximum (instantaneous) capacity less the effect of frost on the outdoor coil and the heat required to defrost it.

HEATING CAPACITIES (cont)

50HS024 (2 TONS)

Temp (F) Air Ent Indoor Coil	Indoor Air Cfm (std)		Air Temp Entering Outdoor Coil (F db at 70% rh)																			
			−10		0		10		17		20		30		40		47		50		60	
60	700	Cap.	3.85	3.85	7.20	7.20	10.60	9.96	12.90	11.80	13.90	12.50	17.30	15.10	21.40	20.50	24.30	24.30	25.50	25.50	29.70	29.70
		kW	1.73		1.81		1.89		1.95		1.97		2.05		2.15		2.22		2.24		2.31	
	800	Cap.	3.97	3.97	7.39	7.39	10.80	10.20	13.20	12.00	14.20	12.80	17.60	15.50	21.90	21.00	24.80	24.80	26.00	26.00	29.80	29.80
		kW	1.77		1.85		1.92		1.97		2.00		2.07		2.16		2.22		2.23		2.28	
	900	Cap.	4.04	4.04	7.52	7.52	11.00	10.40	13.40	12.20	14.50	13.10	18.00	15.70	22.30	21.30	25.30	25.30	26.40	26.40	30.20	30.20
		kW	1.82		1.88		1.95		2.00		2.02		2.09		2.17		2.23		2.24		2.27	
70	700	Cap.	3.47	3.47	6.67	6.67	9.88	9.32	12.10	11.10	13.10	11.80	16.30	14.30	20.30	19.40	23.10	23.10	24.30	24.40	28.60	28.60
		kW	1.75		1.84		1.93		1.99		2.02		2.11		2.22		2.29		2.32		2.41	
	800	Cap.	3.59	3.59	6.85	6.85	10.10	9.54	12.40	11.30	13.40	12.10	16.60	14.60	20.70	19.90	23.60	23.60	24.80	24.80	29.00	29.00
		kW	1.79		1.88		1.96		2.02		2.05		2.13		2.23		2.30		2.32		2.39	
	900	Cap.	3.54	3.65	6.97	6.97	10.30	9.72	12.60	11.50	13.60	12.30	17.00	14.90	21.10	20.30	24.00	24.00	25.30	25.30	29.30	29.30
		kW	1.84		1.92		1.99		2.05		2.07		2.15		2.25		2.31		2.33		2.38	
80	700	Cap.	2.85	2.85	5.98	5.98	9.10	8.59	11.30	10.30	12.20	11.00	15.40	13.50	19.10	18.40	21.80	21.80	23.10	23.10	27.20	27.20
		kW	1.76		1.86		1.96		2.03		2.06		2.17		2.28		2.36		2.39		2.50	
	800	Cap.	2.95	2.95	6.14	6.14	9.33	8.80	11.60	10.50	12.50	11.30	15.70	13.80	19.60	18.80	22.30	22.30	23.60	23.60	27.80	27.80
		kW	1.80		1.90		2.00		2.06		2.09		2.19		2.30		2.37		2.40		2.49	
	900	Cap.	3.06	3.06	6.29	6.29	9.53	8.99	11.80	10.70	12.80	11.50	16.00	14.00	20.00	19.20	22.80	22.80	24.00	24.00	28.20	28.20
		kW	1.85		1.94		2.03		2.09		2.12		2.21		2.31		2.38		2.41		2.48	

50HS030 (2½ TONS)

Temp (F) Air Ent Indoor Coil	Indoor Air Cfm (std)		Air Temp Entering Outdoor Coil (F db at 70% rh)																			
			−10		0		10		17		20		30		40		47		50		60	
60	875	Cap.	4.25	4.25	8.41	8.41	12.60	11.90	15.50	14.10	16.70	15.10	20.90	18.30	26.30	25.30	30.10	30.10	32.00	32.00	38.20	38.20
		kW	1.99		2.11		2.24		2.33		2.37		2.49		2.64		2.75		2.79		2.95	
	1000	Cap.	4.30	4.30	8.55	8.55	12.80	12.10	15.80	14.40	17.00	15.40	21.30	18.70	26.90	25.80	30.80	30.80	32.60	32.60	38.80	38.80
		kW	2.03		2.15		2.27		2.35		2.39		2.50		2.64		2.74		2.78		2.91	
	1125	Cap.	4.37	4.37	8.69	8.69	13.00	12.30	16.00	14.60	17.30	15.60	21.60	19.00	27.30	27.30	26.20	31.30	33.10	33.10	39.30	39.30
		kW	2.08		2.19		2.30		2.38		2.41		2.52		2.65		2.74		2.78		2.90	
70	875	Cap.	3.92	3.92	7.91	7.91	11.90	11.20	14.70	13.40	15.90	14.30	19.90	17.40	25.10	24.10	28.80	28.80	30.60	30.60	36.60	36.60
		kW	2.04		2.18		2.32		2.41		2.46		2.59		2.76		2.87		2.92		3.09	
	1000	Cap.	3.99	3.99	8.07	8.07	12.10	11.50	15.00	13.70	16.20	14.60	20.30	17.80	25.70	24.60	29.40	29.40	31.20	31.20	37.30	37.30
		kW	2.09		2.22		2.35		2.44		2.48		2.61		2.76		2.87		2.92		3.07	
	1125	Cap.	4.10	4.10	8.23	8.23	12.40	11.70	15.30	13.90	16.50	14.90	20.60	18.10	26.10	25.10	30.00	30.00	31.80	31.80	37.90	37.90
		kW	2.13		2.26		2.38		2.47		2.51		2.63		2.78		2.88		2.92		3.06	
80	875	Cap.	3.25	3.25	7.14	7.14	11.00	10.40	13.80	12.50	14.90	13.40	18.80	16.50	23.80	22.80	27.30	27.30	29.00	29.00	34.90	34.90
		kW	2.08		2.23		2.38		2.49		2.53		2.68		2.86		2.98		3.03		3.22	
	1000	Cap.	3.44	3.44	7.39	7.39	11.30	10.70	14.10	12.80	15.30	13.80	19.20	16.80	24.30	23.40	27.90	27.90	29.70	29.70	35.80	35.80
		kW	2.13		2.27		2.41		2.52		2.56		2.70		2.87		2.98		3.03		3.21	
	1125	Cap.	3.56	3.56	7.56	7.56	11.60	10.90	14.40	13.10	15.60	14.00	19.60	17.20	24.80	23.80	28.50	28.50	30.30	30.30	36.50	36.50
		kW	2.17		2.31		2.45		2.55		2.59		2.73		2.88		2.99		3.04		3.20	

LEGEND

Cap. — Heating Capacity (1000 Btuh) (Includes Indoor-Fan Motor Heat)
db — Dry Bulb
kW — Total Power Input (Includes Compressor Motor Power Input, Outdoor-Fan Motor Input, and Indoor-Fan Motor Input)
rh — Relative Humidity

NOTES:

1. ▭ indicates integrated ratings.
2. Integrated capacity is maximum (instantaneous) capacity less the effect of frost on the outdoor coil and the heat required to defrost it.

Performance data (cont)

HEATING CAPACITIES (cont)

50HS036 (3 TONS)

Temp (F) Air Ent Indoor Coil	Indoor Air Cfm (std)		Air Temp Entering Outdoor Coil (F db at 70% rh)																			
			−10		0		10		17		20		30		40		47		50		60	
60	1050	Cap.	3.94	3.94	9.13	9.13	14.30	13.50	17.90	16.40	19.50	17.60	24.70	21.60	31.30	30.00	35.80	35.80	37.90	37.90	44.90	44.90
		kW	2.29		2.44		2.60		2.70		2.75		2.90		3.08		3.20		3.25		3.41	
	1300	Cap.	4.19	4.19	9.52	9.52	14.90	14.00	18.60	17.00	20.20	18.20	25.50	22.40	32.30	31.00	37.10	37.10	39.20	39.20	46.20	46.20
		kW	2.41		2.55		2.68		2.78		2.82		2.96		3.12		3.22		3.26		3.40	
	1500	Cap.	4.33	4.33	9.76	9.76	15.20	14.40	19.00	17.30	20.60	18.60	26.10	22.90	33.00	31.60	37.80	37.80	39.90	39.90	46.80	46.80
		kW	2.49		2.62		2.75		2.84		2.88		3.01		3.16		3.26		3.29		3.41	
70	1050	Cap.	3.21	3.21	8.23	8.23	13.20	12.50	16.80	15.30	18.30	16.50	23.30	20.40	29.70	28.50	34.20	34.20	36.40	36.40	43.60	43.60
		kW	2.29		2.47		2.64		2.76		2.81		2.98		3.18		3.32		3.38		3.58	
	1300	Cap.	3.43	3.43	8.60	8.60	13.80	13.00	17.40	15.90	19.00	17.10	24.10	21.10	30.80	29.50	35.40	35.40	37.60	37.60	44.80	44.80
		kW	2.41		2.57		2.72		2.83		2.88		3.04		3.22		3.34		3.39		3.56	
	1500	Cap.	3.62	3.62	8.88	8.88	14.10	13.40	17.80	16.30	19.40	17.50	24.70	21.60	31.40	30.20	36.10	36.10	38.30	38.30	45.40	45.40
		kW	2.50		2.65		2.80		2.90		2.95		3.10		3.26		3.38		3.42		3.56	
80	1050	Cap.	1.77	1.77	6.81	6.81	11.90	11.20	15.40	14.00	16.90	15.20	21.90	19.20	28.10	27.00	32.50	32.50	34.60	34.60	41.70	41.70
		kW	2.28		2.47		2.67		2.80		2.86		3.05		3.27		3.42		3.49		3.71	
	1300	Cap.	2.18	2.18	7.32	7.32	12.50	11.80	16.00	14.60	17.60	15.80	22.70	19.90	29.10	28.00	33.60	33.60	35.80	35.80	43.20	43.20
		kW	2.40		2.58		2.76		2.88		2.93		3.11		3.31		3.45		3.51		3.71	
	1500	Cap.	2.49	2.49	7.67	7.67	12.90	12.20	16.50	15.00	18.00	16.30	23.20	20.40	29.80	28.60	34.40	34.40	36.60	36.60	43.80	43.80
		kW	2.49		2.66		2.83		2.95		3.00		3.17		3.36		3.49		3.54		3.72	

50HS042 (3½ TONS)

Temp (F) Air Ent Indoor Coil	Indoor Air Cfm (std)		Air Temp Entering Outdoor Coil (F db at 70% rh)																			
			−10		0		10		17		20		30		40		47		50		60	
60	1225	Cap.	14.80	13.60	18.30	16.80	22.20	20.40	25.20	23.00	26.70	24.20	31.70	27.80	37.10	37.10	41.80	41.80	42.80	42.80	47.30	47.30
		kW	2.28		2.47		2.68		2.82		2.89		3.12		3.37		3.60		3.64		3.85	
	1440	Cap.	15.20	13.90	18.70	17.20	22.70	20.80	25.70	23.40	27.20	24.70	32.30	28.30	37.70	37.70	41.80	41.80	42.80	42.80	46.30	46.30
		kW	2.34		2.53		2.73		2.87		2.93		3.16		3.40		3.57		3.62		3.77	
	1575	Cap.	15.50	14.20	19.00	17.50	23.00	21.20	26.10	23.80	27.60	25.00	32.70	28.70	38.20	38.20	41.40	41.40	42.00	42.00	45.50	45.50
		kW	2.40		2.59		2.78		2.92		2.98		3.20		3.44		3.56		3.59		3.73	
70	1225	Cap.	13.60	12.50	17.30	15.90	21.20	19.40	24.00	21.90	25.50	23.10	30.30	26.60	35.60	35.60	40.20	40.20	41.50	41.50	46.70	46.70
		kW	2.29		2.51		2.75		2.91		2.98		3.23		3.50		3.73		3.81		4.06	
	1400	Cap.	13.90	12.80	17.60	16.20	21.60	19.80	24.50	22.30	26.00	23.50	30.90	27.10	36.30	36.30	40.80	40.80	42.00	42.00	46.50	46.50
		kW	2.36		2.57		2.80		2.95		3.03		3.27		3.53		3.76		3.81		4.02	
	1575	Cap.	14.30	13.10	18.00	16.50	22.00	20.20	24.90	22.70	26.40	23.90	31.40	27.50	36.80	36.80	41.10	41.10	41.90	41.90	45.80	45.80
		kW	2.42		2.63		2.85		3.00		3.07		3.31		3.56		3.76		3.80		3.97	
80	1225	Cap.	12.20	11.20	16.00	14.70	19.90	18.30	22.80	20.80	24.20	22.00	28.90	25.30	34.00	34.00	38.60	38.60	39.80	39.80	45.80	45.80
		kW	2.30		2.54		2.79		2.98		3.06		3.33		3.62		3.86		3.95		4.27	
	1400	Cap.	12.50	11.50	16.40	15.10	20.50	18.80	23.30	21.30	24.70	22.40	29.50	25.80	34.70	34.70	39.20	39.20	40.60	40.60	45.90	45.90
		kW	2.36		2.60		2.85		3.02		3.10		3.37		3.65		3.88		3.97		4.23	
	1575	Cap.	12.80	11.80	16.70	15.40	20.90	19.10	23.70	21.60	25.10	22.80	30.00	26.30	35.30	35.30	39.80	39.80	40.90	40.90	45.50	45.50
		kW	2.42		2.66		2.91		3.07		3.15		3.41		3.68		3.92		3.98		4.19	

LEGEND

Cap. — Heating Capacity (1000 Btuh) (Includes Indoor-Fan Motor Heat)
db — Dry Bulb
kW — Total Power Input (Includes Compressor Motor Power Input, Outdoor-Fan Motor Input, and Indoor-Fan Motor Input)
rh — Relative Humidity

NOTES:

1. ▭ indicates integrated ratings.
2. Integrated capacity is maximum (instantaneous) capacity less the effect of frost on the outdoor coil and the heat required to defrost it.

HEATING CAPACITIES (cont)

50HS048 (4 TONS)

Temp (F) Air Ent Indoor Coil	Indoor Air Cfm (std)		Air Temp Entering Outdoor Coil (F db at 70% rh)																			
			−10		0		10		17		20		30		40		47		50		60	
60	1400	Cap.	11.40	11.40	17.30	17.30	23.20	21.90	27.40	25.00	29.20	26.30	35.10	30.80	42.60	40.80	47.90	47.90	50.10	50.10	57.50	57.50
		kW	3.27		3.40		3.54		3.64		3.68		3.82		4.00		4.14		4.19		4.38	
	1600	Cap.	11.50	11.50	17.50	17.50	23.50	22.10	27.80	25.30	29.60	26.70	35.60	31.20	43.10	41.30	48.40	48.40	50.30	50.30	56.70	56.70
		kW	3.33		3.45		3.57		3.66		3.70		3.82		3.99		4.11		4.15		4.29	
	1800	Cap.	11.70	11.70	17.80	17.80	23.90	22.40	28.10	25.60	29.90	27.00	36.00	31.50	43.40	41.60	48.60	48.60	50.30	50.30	56.00	56.00
		kW	3.40		3.51		3.63		3.71		3.74		3.85		4.00		4.10		4.14		4.26	
70	1400	Cap.	11.10	11.10	16.90	16.90	22.70	21.40	26.80	24.50	28.60	25.80	34.40	30.10	41.80	40.00	46.90	46.90	49.20	49.20	56.20	56.20
		kW	3.54		3.70		3.86		3.97		4.02		4.17		4.38		4.53		4.60		4.82	
	1600	Cap.	11.30	11.30	17.20	17.20	23.10	21.70	27.20	24.80	29.00	26.10	34.90	30.50	42.30	40.50	47.50	47.50	49.60	49.60	56.80	56.80
		kW	3.60		3.74		3.89		3.98		4.03		4.17		4.36		4.49		4.54		4.72	
	1800	Cap.	11.50	11.50	17.40	17.40	23.40	22.00	27.50	25.10	29.30	26.50	35.30	30.90	42.70	40.90	47.90	47.90	49.90	49.90	56.60	56.60
		kW	3.67		3.80		3.93		4.02		4.06		4.19		4.36		4.48		4.53		4.68	
80	1400	Cap.	10.90	10.90	16.60	16.60	22.30	21.00	26.30	24.00	28.00	25.30	33.70	29.60	40.90	39.20	45.90	45.90	48.30	48.30	56.30	56.30
		kW	3.83		4.01		4.20		4.33		4.38		4.57		4.80		4.97		5.04		5.30	
	1600	Cap.	11.10	11.10	16.90	16.90	22.60	21.30	26.70	24.30	28.40	25.60	34.20	29.90	41.40	39.70	46.50	46.50	48.90	48.90	56.80	56.80
		kW	3.90		4.06		4.22		4.34		4.39		4.55		4.76		4.91		4.98		5.21	
	1800	Cap.	11.30	11.30	17.10	17.10	22.90	21.60	27.00	24.60	28.80	25.90	34.60	30.30	41.90	40.10	47.00	47.00	49.20	49.20	56.40	56.40
		kW	3.96		4.11		4.26		4.37		4.41		4.56		4.76		4.89		4.95		5.13	

50HS060 (5 TONS)

Temp (F) Air Ent Indoor Coil	Indoor Air Cfm (std)		Air Temp Entering Outdoor Coil (F db at 70% rh)																			
			−10		0		10		17		20		30		40		47		50		60	
60	1750	Cap.	12.20	12.20	19.60	19.60	27.00	25.40	32.20	29.30	34.40	31.00	41.80	36.60	51.10	48.90	57.60	57.60	60.40	60.40	70.10	70.10
		kW	3.86		4.01		4.17		4.28		4.32		4.48		4.68		4.82		4.88		5.09	
	2000	Cap.	12.60	12.60	20.00	20.00	27.40	25.80	32.60	29.80	34.90	31.40	42.30	37.00	51.70	49.50	58.30	58.30	61.20	61.20	70.70	70.70
		kW	3.94		4.08		4.21		4.31		4.35		4.49		4.67		4.79		4.85		5.03	
	2250	Cap.	12.90	12.90	20.30	20.30	27.80	26.20	33.00	30.10	35.30	31.80	42.80	37.50	52.30	50.10	58.90	58.90	61.70	61.70	70.80	70.80
		kW	4.02		4.14		4.27		4.36		4.39		4.52		4.68		4.80		4.85		5.00	
70	1750	Cap.	12.10	12.10	19.30	19.30	26.50	24.90	31.50	28.80	33.70	30.40	40.90	35.90	50.00	47.90	56.30	56.30	59.20	59.20	69.00	69.00
		kW	4.20		4.37		4.55		4.67		4.72		4.89		5.11		5.27		5.34		5.58	
	2000	Cap.	12.40	12.40	19.70	19.70	26.90	25.30	32.00	29.20	34.20	30.80	41.40	36.30	50.60	48.50	57.00	57.00	59.90	59.90	69.60	69.60
		kW	4.28		4.43		4.58		4.69		4.74		4.89		5.08		5.22		5.28		5.49	
	2250	Cap.	12.60	12.60	19.90	19.90	27.20	25.60	32.40	29.50	34.60	31.20	41.90	36.70	51.10	49.00	57.60	57.60	60.50	60.50	69.90	69.90
		kW	4.36		4.50		4.63		4.73		4.77		4.91		5.09		5.21		5.27		5.45	
80	1750	Cap.	10.40	10.40	17.90	17.90	25.30	23.90	30.50	27.90	32.80	29.60	40.30	35.30	49.00	47.00	55.20	55.20	58.10	58.10	67.90	67.90
		kW	4.47		4.69		4.92		5.07		5.14		5.36		5.60		5.77		5.85		6.12	
	2000	Cap.	11.20	11.20	18.60	18.60	25.90	24.40	31.10	28.30	33.30	30.00	40.70	35.60	49.60	47.50	55.80	55.80	58.70	58.70	68.40	68.40
		kW	4.58		4.77		4.96		5.09		5.15		5.34		5.55		5.70		5.77		6.00	
	2250	Cap.	11.50	11.50	18.90	18.90	26.30	24.80	31.50	28.70	33.70	30.40	41.10	36.00	50.10	48.00	56.50	56.50	59.30	59.30	68.80	68.80
		kW	4.67		4.84		5.01		5.13		5.18		5.35		5.55		5.68		5.74		5.94	

LEGEND

Cap. — Heating Capacity (1000 Btuh) (Includes Indoor-Fan Motor Heat)
db — Dry Bulb
kW — Total Power Input (Includes Compressor Motor Power Input, Outdoor-Fan Motor Input, and Indoor-Fan Motor Input)
rh — Relative Humidity

NOTES:

1. ▭ indicates integrated ratings.
2. Integrated capacity is maximum (instantaneous) capacity less the effect of frost on the outdoor coil and the heat required to defrost it.

Performance data (cont)

DRY COIL AIR DELIVERY* — HORIZONTAL DISCHARGE (DEDUCT 10% FOR 208 V)

UNIT 50HS	MOTOR SPEED		230 AND 460 V HORIZONTAL DISCHARGE										
			External Static Pressure (in. wg)										
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
018	Low	Watts	230	225	220	210	195	170	—	—	—	—	—
		Cfm	760	745	725	695	640	540	—	—	—	—	—
	High	Watts	—	—	—	—	270	235	200	—	—	—	—
		Cfm	—	—	—	—	850	700	450	—	—	—	—
024	Low	Watts	280	275	265	255	250	245	240	—	—	—	—
		Cfm	820	810	755	700	660	600	560	—	—	—	—
	Med	Watts	365	360	350	345	340	330	320	310	300	—	—
		Cfm	1025	1010	975	940	900	850	800	720	630	—	—
	High	Watts	—	—	490	480	470	460	445	430	410	390	380
		Cfm	—	—	1300	1255	1200	1150	1080	1005	915	790	620
030	Low	Watts	—	—	—	—	—	—	—	—	—	—	—
		Cfm	—	—	—	—	—	—	—	—	—	—	—
	Med	Watts	—	365	360	360	350	350	—	—	—	—	—
		Cfm	—	1060	1020	980	935	880	—	—	—	—	—
	High	Watts	—	—	—	—	490	485	475	460	450	430	—
		Cfm	—	—	—	—	1270	1220	1170	1100	1020	920	—
036	Low	Watts	520	495	474	458	495	425	—	—	—	—	—
		Cfm	1375	1335	1290	1244	1200	1146	—	—	—	—	—
	Med	Watts	575	560	535	510	480	460	440	425	—	—	—
		Cfm	1520	1490	1450	1440	1380	1300	1200	1080	—	—	—
	High	Watts	—	—	—	—	650	614	575	540	510	480	—
		Cfm	—	—	—	—	1560	1500	1380	1280	1170	1060	—
042	Low	Watts	424	416	408	396	384	373	333	312	—	—	—
		Cfm	1288	1227	1205	1168	1116	1064	949	851	—	—	—
	Med	Watts	557	549	571	509	506	480	465	430	394	358	—
		Cfm	1566	1536	1485	1440	1388	1326	1253	1124	995	366	—
	High	Watts	836	783	757	721	697	660	623	589	555	511	465
		Cfm	2010	1955	1915	1851	1747	1654	1540	1415	1305	1134	852
048	Low	Watts	1080	1040	1020	970	910	840	785	730	680	620	540
		Cfm	2100	2090	2080	2060	1980	1900	1810	1710	1590	1450	1200
	High	Watts	1230	1190	1125	1060	1010	940	880	820	760	710	660
		Cfm	2390	2340	2280	2210	2150	2030	1900	1770	1630	1480	1300
060	Low	Watts	1150	1100	1050	1010	950	900	850	800	730	650	—
		Cfm	2500	2410	2330	2260	2170	2080	1990	1880	1750	1580	—
	High	Watts	—	—	—	—	—	1170	1110	1050	990	920	880
		Cfm	—	—	—	—	—	2470	2340	2200	2040	1870	1700

*Air delivery values are based on operating voltage of 230 v or 460 v, dry coil, without filter or electric heater. Deduct wet coil, filter, and electric heater pressure drops to obtain external static pressure available for ducting.

NOTES:
1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Indoor coil frosting may occur at airflows below this point.
2. Dashes indicate portions of table that are beyond the blower motor capacity or are not recommended.

DRY COIL AIR DELIVERY* — VERTICAL DISCHARGE (DEDUCT 10% FOR 208 V)

UNIT 50HS	MOTOR SPEED		230 AND 460 V VERTICAL DISCHARGE										
			External Static Pressure (in. wg)										
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
018	Low	Watts	230	225	220	210	195	170	—	—	—	—	—
		Cfm	760	745	725	695	640	540	—	—	—	—	—
	High	Watts	—	—	—	—	270	235	200	—	—	—	—
		Cfm	—	—	—	—	850	700	450	—	—	—	—
024	Low	Watts	280	275	265	255	250	245	240	—	—	—	—
		Cfm	820	810	755	700	660	600	560	—	—	—	—
	Med	Watts	365	360	350	345	340	330	320	310	300	—	—
		Cfm	1025	1010	975	940	900	850	800	720	630	—	—
	High	Watts	—	—	490	480	470	460	445	430	410	390	380
		Cfm	—	—	1300	1255	1200	1150	1080	1005	915	790	620
030	Low	Watts	—	—	—	—	—	—	—	—	—	—	—
		Cfm	—	—	—	—	—	—	—	—	—	—	—
	Med	Watts	—	365	360	360	350	350	—	—	—	—	—
		Cfm	—	1060	1020	980	935	880	—	—	—	—	—
	High	Watts	—	—	—	—	490	485	475	460	450	430	—
		Cfm	—	—	—	—	1270	1220	1170	1100	1020	920	—
036	Low	Watts	520	495	474	458	495	425	—	—	—	—	—
		Cfm	1375	1335	1290	1244	1200	1146	—	—	—	—	—
	Med	Watts	575	560	535	510	480	460	440	425	—	—	—
		Cfm	1520	1490	1450	1440	1380	1300	1200	1080	—	—	—
	High	Watts	—	—	—	—	650	614	575	540	510	480	—
		Cfm	—	—	—	—	1560	1500	1380	1280	1170	1060	—
042	Low	Watts	424	416	408	396	384	373	333	312	—	—	—
		Cfm	1288	1227	1205	1168	1116	1064	949	851	—	—	—
	Med	Watts	557	549	571	509	506	480	465	430	394	358	—
		Cfm	1566	1536	1485	1440	1388	1326	1253	1124	995	366	—
	High	Watts	836	783	757	721	697	660	623	589	555	511	465
		Cfm	2010	1955	1915	1851	1747	1654	1540	1415	1305	1134	852
048	Low	Watts	1080	1040	1020	970	910	840	785	730	680	620	540
		Cfm	2100	2090	2080	2060	1980	1900	1810	1710	1590	1450	1200
	High	Watts	1230	1190	1125	1060	1010	940	880	820	760	710	660
		Cfm	2390	2340	2280	2210	2150	2030	1900	1770	1630	1480	1300
060	Low	Watts	890	850	810	780	740	710	660	630	580	—	—
		Cfm	2500	2410	2330	2260	2170	2080	1970	1860	1700	—	—
	High	Watts	—	—	—	1000	960	910	870	830	790	750	—
		Cfm	—	—	—	2480	2370	2250	2120	2000	1850	1690	—

*Air delivery values are based on operating voltage of 230 v or 460 v, dry coil, without filter or electric heater. Deduct wet coil, filter, and electric heater pressure drops to obtain external static pressure available for ducting.

NOTES:
1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Indoor coil frosting may occur at airflows below this point.
2. Dashes indicate portions of table that are beyond the blower motor capacity or are not recommended.

Performance data (cont)

WET COIL PRESSURE DROP

UNIT 50HS	AIRFLOW (cfm)	PRESSURE DROP (in. wg)
018	600	0.069
	700	0.082
	800	0.102
	900	0.116
024	600	0.039
	700	0.058
	800	0.075
	900	0.088
030	900	0.088
	1000	0.095
	1200	0.123
036	1000	0.068
	1200	0.088
	1400	0.108
	1600	0.123
042	1000	0.030
	1200	0.050
	1400	0.068
	1600	0.082
048	1400	0.068
	1600	0.075
	1800	0.088
060	1700	0.082
	1900	0.095
	2100	0.108
	2300	0.123

ACCESSORY ELECTRIC HEAT PRESSURE DROP (in. wg)

HEATER kW	CFM								
	600	800	1000	1200	1400	1600	1800	2000	2200
5-20	0.030	0.033	0.037	0.042	0.047	0.052	0.060	0.067	0.075

FILTER PRESSURE DROP (in. wg)

UNIT 50HS	FILTER SIZE (in.)	CFM																		
		500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
018,024	20 x 20	0.05	0.07	0.08	0.10	0.12	0.13	—	—	—	—	—	—	—	—	—	—	—	—	—
030	20 x 24	—	—	—	—	0.09	0.10	0.11	0.13	0.14	—	—	—	—	—	—	—	—	—	—
036	24 x 24	—	—	—	—	—	0.08	0.09	0.10	0.11	0.12	0.14	0.15	—	—	—	—	—	—	—
042-060	24 x 30	—	—	—	—	—	—	—	—	—	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18

ACCESSORY ELECTRIC HEATER PACKAGE USAGE — DUAL-POINT POWER CONNECTIONS

ELECTRIC HEATER ACCESSORY KIT	KIT PART NUMBER CPHEATER---A00	UNIT 50HS						
		018	024	030	036	042	048	060
208/240-1-60								
5.0 kW	001	X	X	X	X	X		
5.0 kW	013	—	—	—	—	—	X	X
7.5 kW	002	X	X	—	—	—	—	—
7.5 kW	014	—	—	X	X	X	X	X
10.0 kW	015	X	X	X	X	X	X	X
15.0 kW	016	—	—	X	X	X	X	X
20.0 kW	017	—	—	—	X	X	X	X
208/240-3-60								
10.0 kW	007	—	—	X	X	X	X	—
10.0 kW	018	—	—	—	—	—	—	X
15.0 kW	019	—	—	X	X	X	X	X
17.5 kW	020	—	—	—	X	X	X	X
480-3-60								
10.0 kW	010	—	—	—	X	X	X	X
15.0 kW	011	—	—	—	X	X	X	X
20.0 kW	012	—	—	—	X	X	X	X

ELECTRIC HEATER PACKAGES — 208/240 V, SINGLE-PHASE, SINGLE POINT WIRING CONNECTIONS

UNIT 50HS	ELECTRIC HEAT/ ACCESSORY KIT CPHEATER---A00	ELECTRIC HEAT (kW)*		HEATER FLA		MIN CIRCUIT AMPACITY FOR WIRE SIZING		MAX FUSE OR HACR BRKR		MOCP	
		208 V	240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V	240 V
018	001	3.75	5.0	18.1	20.8	38.1	41.5	40	45	—	—
	002	5.60	7.5	27.1	31.3	49.3	54.6	50	60	—	—
	015	7.50	10.0	36.1	41.7	60.6	67.6	—	—	70	70
024	001	3.75	5.0	18.1	20.8	40.0	43.4	45	45	—	—
	002	5.60	7.5	27.1	31.3	51.2	56.5	60	60	—	—
	015	7.50	10.0	36.1	41.7	62.5	69.5	—	—	70	70
030	001	3.75	5.0	18.1	20.8	44.9	48.4	50	50	—	—
	014	5.60	7.5	27.1	31.3	56.2	61.4	60	—	—	70
	015	7.50	10.0	36.1	41.7	67.5	74.5	—	—	70	80
	016	11.30	15.0	54.1	62.0	90.0	99.9	—	—	90	100
036	001	3.75	5.0	18.1	20.8	49.3	52.7	60	60	—	—
	014	5.60	7.5	27.1	31.3	60.5	65.8	—	—	70	70
	015	7.50	10.0	36.1	41.7	71.8	78.8	—	—	80	80
	016	11.30	15.0	54.1	62.0	94.3	104.2	—	—	100	110
	017	15.00	20.0	72.2	83.3	116.9	130.5	—	—	125	150
042	001	3.75	5.0	18.1	20.8	53.5	56.9	60	60	—	—
	014	5.60	7.5	27.1	31.3	64.7	70.0	—	—	70	80
	015	7.50	10.0	36.1	41.7	76.0	83.0	—	—	80	90
	016	11.30	15.0	54.1	62.0	98.5	108.4	—	—	100	110
	017	15.00	20.0	72.2	83.3	121.2	135.0	—	—	125	150
048	013	3.75	5.0	18.1	20.8	62.7	66.1	—	—	80	80
	014	5.60	7.5	27.1	31.3	73.9	79.2	—	—	90	90
	015	7.50	10.0	36.1	41.7	85.2	92.2	—	—	100	100
	016	11.30	15.0	54.1	62.0	107.7	117.6	—	—	110	125
	017	15.00	20.0	72.2	83.3	130.4	144.3	—	—	150	150
060	013	3.75	5.0	18.1	20.8	71.0	74.5	—	—	90	100
	014	5.60	7.5	27.1	31.3	82.3	87.5	—	—	100	100
	015	7.50	10.0	36.1	41.7	93.6	100.5	—	—	100	110
	016	11.30	15.0	54.1	62.0	116.1	125.9	—	—	125	150
	017	15.00	20.0	72.2	83.3	138.7	152.6	—	—	150	175

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
MOCP — Maximum Overcurrent Protection (fuses or HACR-type circuit breaker)
NEC — National Electrical Code

*Electric heat capacity (kW) is based on heater voltages of 208 v or 240 v. If power distribution voltage to units varies from rated heater voltage, see Multiplication Factors table on page 21.

NOTE: In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker.

Performance data (cont)

ELECTRIC HEATER PACKAGES — 208/240 V, 3-PHASE, SINGLE-POINT WIRING CONNECTIONS

UNIT 50HS	ELECTRIC HEAT/ ACCESSORY KIT CPHEATER---A00	ELECTRIC HEAT (kW)*		HEATER FLA		MIN CIRCUIT AMPACITY FOR WIRE SIZING		MAX FUSE OR HACR BRKR		MOCP	
		208 V	240 V	208 V	240 V	208 V	240 V	208 V	240 V	208 V	240 V
030	007	7.5	10.0	20.8	24.1	42.7	46.7	45	50	—	—
	019	11.3	15.0	31.3	36.1	55.7	61.7	60	—	—	70
036	007	7.5	10.0	20.8	24.1	44.5	48.5	50	50	—	—
	019	11.3	15.0	31.3	36.1	57.5	63.6	60	—	—	70
	020	13.1	17.5	36.5	42.1	64.0	71.1	—	—	70	80
042	007	7.5	10.0	20.8	24.1	49.0	53.0	50	60	—	—
	019	11.3	15.0	31.3	36.1	62.0	68.0	—	—	70	70
	020	13.1	17.5	36.5	42.1	68.5	75.5	—	—	70	80
048	007	7.5	10.0	20.8	24.1	51.9	55.9	60	60	—	—
	019	11.3	15.0	31.3	36.1	64.9	71.0	—	—	70	80
	020	13.1	17.5	36.5	42.1	71.4	78.5	—	—	80	80
060	018	7.5	10.0	20.8	24.1	58.5	62.5	—	—	70	70
	019	11.3	15.0	31.3	36.1	71.5	77.5	—	—	80	80
	020	13.1	17.5	36.5	42.1	78.0	85.0	—	—	80	90

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
MOCP — Maximum Overcurrent Protection (fuses or HACR-type circuit breaker)
NEC — National Electrical Code

*Electric heat capacity (kW) is based on heater voltages of 208 v or 240 v. If power distribution voltage to units varies from rated heater voltage, see Multiplication Factors table on page 21.

NOTE: In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker.

ELECTRIC HEATER PACKAGES — 480 V, 3-PHASE, SINGLE-POINT WIRING CONNECTIONS

UNIT 50HS	ELECTRIC HEAT/ ACCESSORY KIT CPHEATER---A00	ELECTRIC HEAT (kW)*	HEATER FLA	MIN CIRCUIT AMPACITY FOR WIRE SIZING	MAX FUSE OR HACR BRKR
		480 V		480 V	480 V
036	010	10.0	12.0	24.0	25
	011	15.0	18.0	31.5	35
	012	17.5	21.0	35.3	40
042	010	10.0	12.0	25.8	30
	011	15.0	18.0	33.4	35
	012	17.5	21.0	37.1	40
048	010	10.0	12.0	28.7	30
	011	15.0	18.0	36.2	40
	012	17.5	21.0	40.0	40
060	010	10.0	12.0	31.8	35
	011	15.0	18.0	39.4	40
	012	17.5	21.0	43.1	45

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection (fuses or HACR-type circuit breaker)
NEC — National Electrical Code

*Electric heat capacity (kW) is based on heater voltages of 480 v. If power distribution voltage to units varies from rated heater voltage, see Multiplication Factors table on page 21.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker.
2. This unit must be supplied from a 480 v, 3-phase power supply with a maximum voltage to ground of 300 v.

MULTIPLICATION FACTORS

HEATER VOLTAGE RATING	ACTUAL HEATER VOLTAGE	MULTIPLICATION FACTOR
240	200	0.69
	208	0.75
	220	0.84
	230	0.92
	240	1.00
480	415	0.75
	440	0.84
	460	0.92
	480	1.00

Example: 20.0 kW (at 240 v) heater on 230 v
= 20.0 (0.92 multiplication factor)
= 18.4 kW capacity at 230 v

MINIMUM AIRFLOW (CFM) FOR SAFE ELECTRIC HEATER OPERATION

UNIT 50HS	018	024	030	036	042	048	060
HORIZONTAL DISCHARGE	700	800	1000	1300	1300	1600	1750
VERTICAL DISCHARGE	700	800	1000	1300	1300	1600	1750

Electrical data

UNIT 50HS	V-PH-Hz	COMPRESSOR		OFM	IFM	POWER SUPPLY FUSE OR HACR BRK		AWG 60 C MIN WIRE	MAX WIRE LENGTH
		RLA	LRA	FLA	FLA	MCA	Max		
018	208/230-1-60	10.4	49.0	0.7	1.8	15.5	25	14	75
024	208/230-1-60	11.2	61.0	1.4	2.0	17.4	25	12	80
030	208/230-1-60	14.4	82.0	1.4	2.6	22.0	30	12	80
	208/230-3-60	10.4	65.5	1.4	2.6	17.0	25	14	55
036	208/230-1-60	18.0	96.0	1.4	2.8	26.7	40	10	90
	208/230-3-60	11.4	75.0	1.4	2.8	18.5	25	12	65
	460-3-60	5.4	40.0	0.8	1.4	9.0	10	14	100
042	208/230-1-60	20.4	102.0	1.4	4.0	30.9	50	8	100
	208/230-3-60	14.0	91.0	1.4	4.0	22.9	30	10	85
	460-3-60	6.4	42.0	0.8	2.0	10.8	15	14	100
048	208/230-1-60	26.4	129.0	2.1	5.0	40.1	60	6	100
	208/230-3-60	15.0	99.0	2.1	5.0	25.9	40	10	75
	460-3-60	8.2	49.5	1.1	2.3	13.7	20	14	100
060	208/230-1-60	32.1	169.0	2.1	6.2	32.4	50	8	95
	208/230-3-60	19.3	123.0	2.1	6.2	32.4	50	8	95
	460-3-60	10.0	62.0	1.1	3.2	16.8	25	12	100

LEGEND

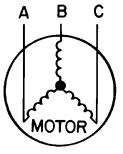
AWG — American Wire Gage
CSA — Canadian Standards Association
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor-Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
NEC — National Electrical Code
OFM — Outdoor-Fan Motor
RLA — Rated Load Amps

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The CSA units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

   $$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

   Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.

(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Sequence of operation

When power is supplied to unit, the transformer (TRAN) is energized.

On units with crankcase heater, heater is also energized.

Cooling — With the thermostat subbase in the cooling position, and when the space temperature comes within 2° F of the cooling set point, the thermostat makes circuit R-O. This energizes the reversing valve solenoid (RVS) and places the unit in standby condition for cooling.

As the space temperature continues to rise, the second stage of the thermostat makes, closing circuit R-Y. When compressor time delay (5 ± 2 minutes) is completed, a circuit is made to contactor (C), starting the compressor (COMP) and outdoor-fan motor (OFM). Circuit R-G is made at the same time, energizing the indoor-fan relay (IFR) and starting the indoor-fan motor (IFM) after a 1-second delay.

When the thermostat is satisfied, contacts open, deenergizing C. The COMP and OFM stop, and the IFM stops after a short time delay.

Heating — On a call for heat, thermostat makes circuits R-Y and R-G.

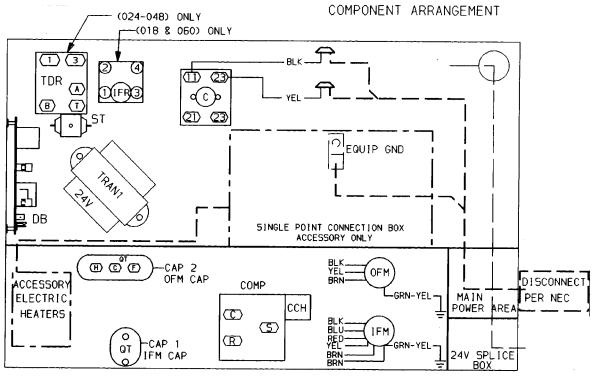
When compressor time delay (5 ± 2 minutes) is completed, a circuit is made to C, starting COMP and OFM. Circuit R-G also is completed, energizing IFR and starting IFM after a 1-second delay.

Should room temperature continue to fall, circuit R-W is made through second-stage thermostat bulb. If optional electric heat package is used, a relay is energized, bringing on first bank of supplemental electric heat. When thermostat is satisfied, contacts open, deenergizing contactor and relay; motors and heaters deenergize. The IFM may be controlled by a time-delay relay that keeps the fan on for 30 seconds.

Defrost — Defrost board (DB) is a time and temperature control, which includes a field-selectable time period between checks for defrost (30, 50, and 90 minutes). Electronic timer and defrost cycle start only when contactor is energized and defrost thermostat (DFT) is closed.

Defrost mode is identical to cooling mode, except outdoor-fan motor stops and a bank of optional electric heat turns on to warm air supplying the conditioned space.

Typical single-phase control wiring schematic

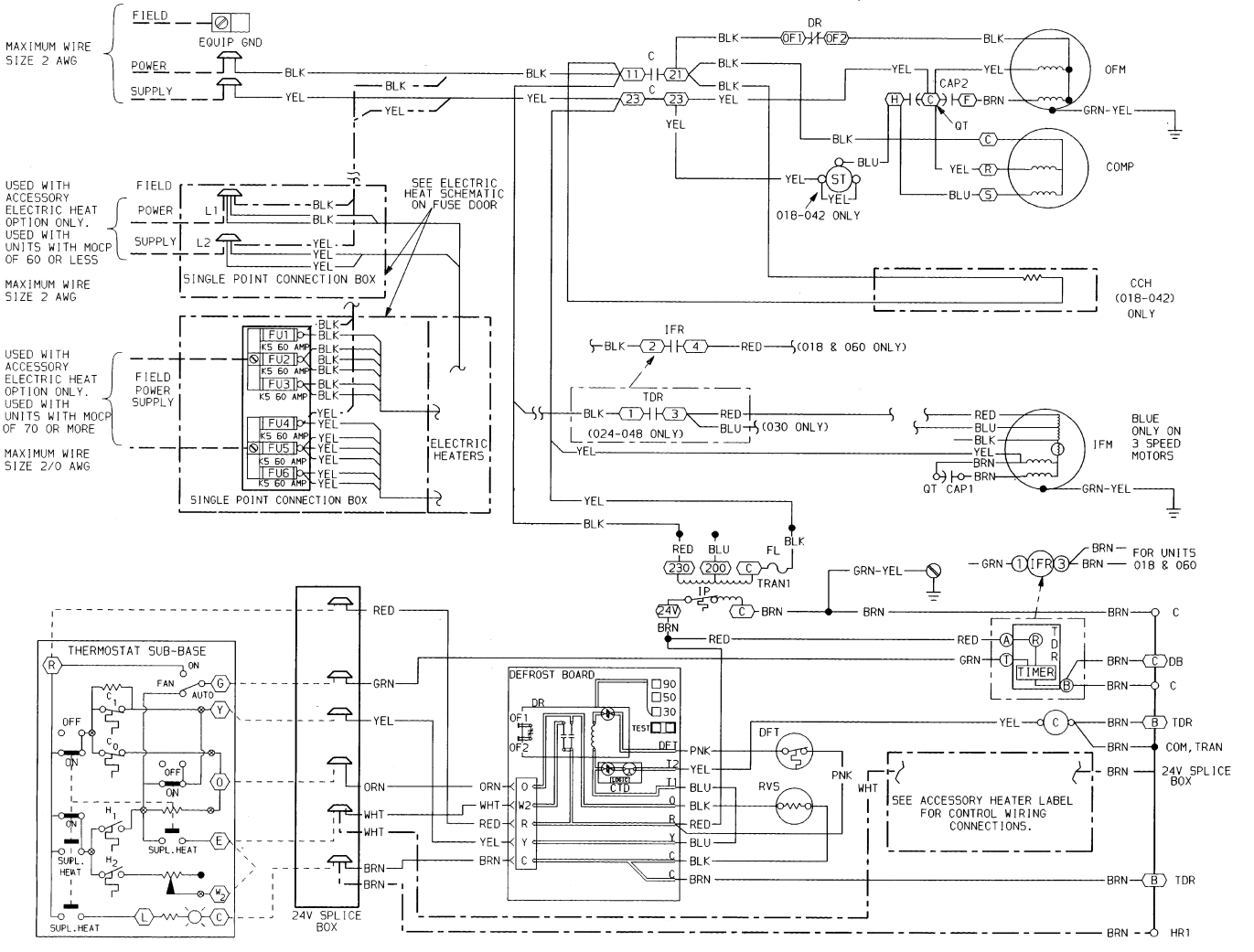


NOTES:
1. If any of the original wire furnished must be replaced, it must be replaced with type 90° C wire or its equivalent.
2. Thermostat: HH07AT171
   Subbase: HH93AZ188
3. Set heat anticipator at .26.
4. Use copper conductors only.

LEGEND

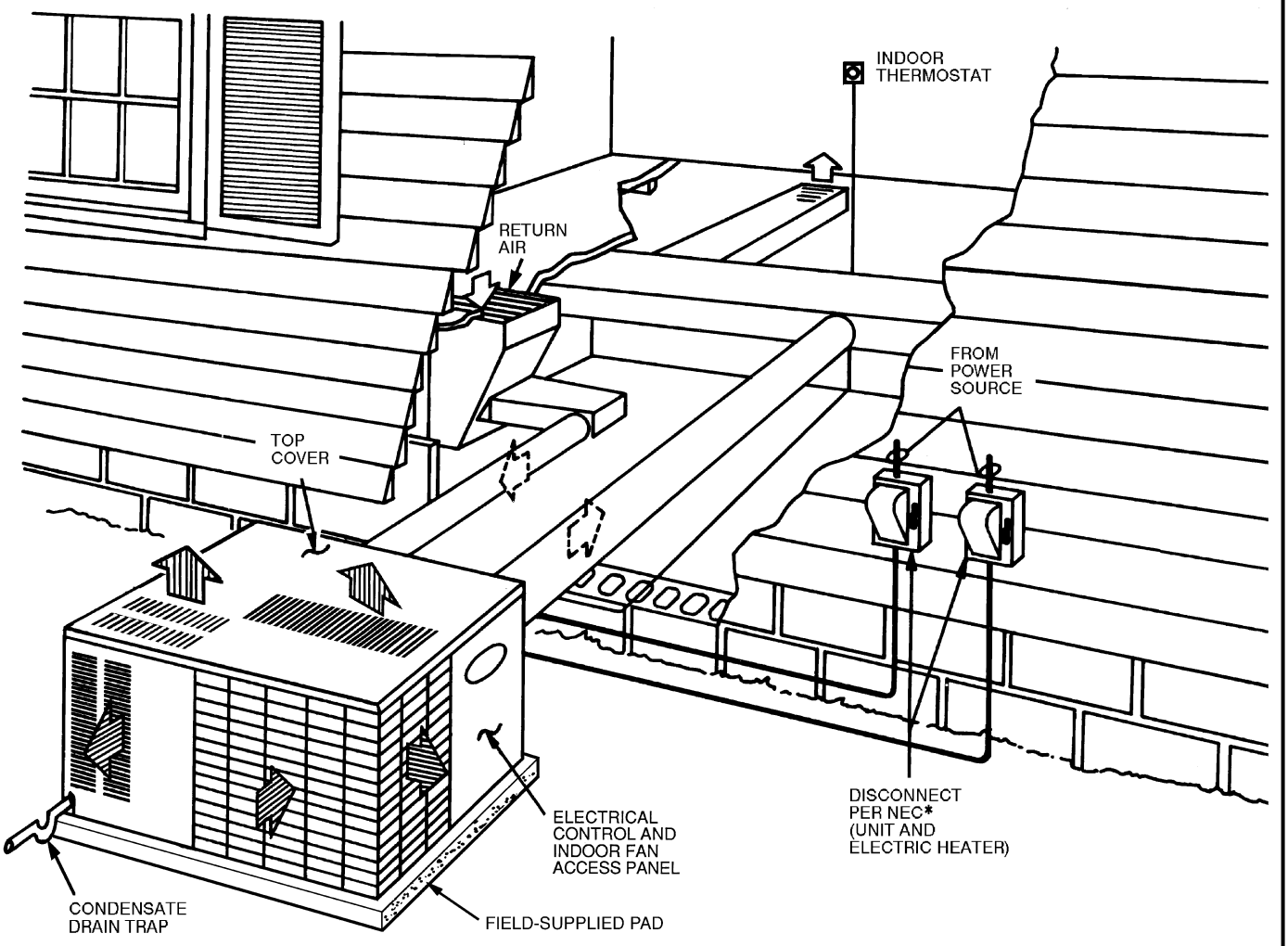
AWG	—	American Wire Gage
C	—	Contactor, Compressor
CAP	—	Capacitor
CCH	—	Crankcase Heater
COM	—	Common
COMP	—	Compressor Motor
DB	—	Defrost Board
DFT	—	Defrost Thermostat
DR	—	Defrost Relay
EQUIP	—	Equipment
FU	—	Fuse
GND	—	Ground
HR	—	Heater Relay (Strip Heat)
IFM	—	Indoor Fan Motor
IFR	—	Indoor-Fan Relay
IP	—	Internal Protector
MOCP	—	Maximum Overcurrent Protection
NEC	—	National Electrical Code
OFM	—	Outdoor-Fan Motor
QT	—	Quadruple Terminal
RVS	—	Reversing Valve Solenoid
ST	—	Start Thermistor
TDR	—	Time-Delay Relay
TRAN	—	Transformer

Field Splice
Terminal (Marked)
Terminal (Unmarked)
Terminal Block
Splice
Factory Wiring
Field Control Wiring
Field Power Wiring
Accessory or Optional Wiring
To indicate common potential only, not to represent wiring.



Typical piping and wiring

SLAB MOUNT

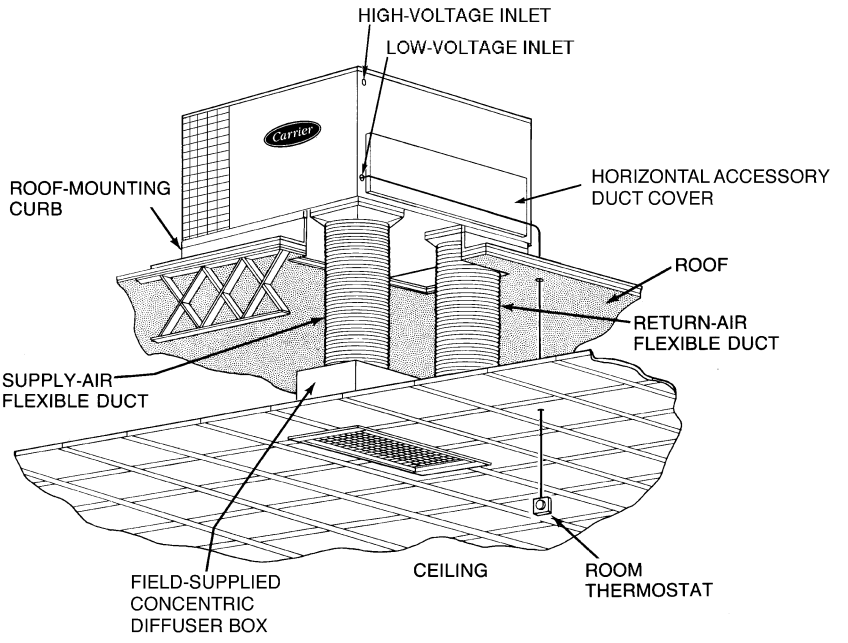


Power Wiring
Control Wiring
Outdoor Airflow
Indoor Airflow

*Separate disconnect per National Electrical Code (NEC) is required for electric heater when single-point connection is not used.

Typical installation (cont)

CURB MOUNT



Guide specifications

Packaged Rooftop Air-to-Air Heat Pump Constant Volume Application

HVAC Guide Specifications

Size Range: **1½ to 5 Tons, Nominal (Cooling)**
18,000 to 60,000 Btuh, Nominal (Heating)

Carrier Model Number: **50HS**

Part 1 — General

1.01 SYSTEM DESCRIPTION

Outdoor package, electrically controlled, air-to-air heat pump utilizing a reciprocating or scroll compressor for heating and cooling duty. Unit shall discharge supply air horizontally or vertically as shown on contract drawings.

1.02 QUALITY ASSURANCE

A. Unit shall be rated in accordance with ARI Standards 210/240-89, and 270-84. Designed in accordance with UL Standard 1995.

B. Unit shall be designed to conform to ASHRAE 15.

C. Unit shall be UL listed and CSA certified as a total package for safety requirements.

D. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

Part 2 — Products

2.01 EQUIPMENT

A. General:

Factory-assembled, single piece, air-to-air heat pump. Contained within the unit enclosure shall be all factory wiring, piping, controls, and refrigerant charge (R-22).

B. Unit Cabinet:

1. Unit cabinet shall be constructed of phosphated, bonderized, zinc-coated, prepainted steel.
2. Indoor fan compartment cabinet surfaces shall be insulated with a minimum ½ in. thick, flexible fiberglass insulation, coated on the air side, with aluminum foil-faced fiberglass insulation.
3. Cabinet panels shall be easily removable for servicing.
4. Unit shall have a factory-installed condensate drain.
5. Unit insulation conforms to ASHRAE 62P.

C. Fans:

1. Indoor Blower (Indoor Fan):
   a. Fan shall be 2- or 3-speed, direct drive as shown on the equipment drawings.
   b. Fan wheel shall be made from steel, be double-inlet type. It shall have forward-curved blades with a corrosion-resistant finish and shall be dynamically balanced.
2. Outdoor fan shall be of the direct-driven propeller type with aluminum blades, riveted to corrosion-resistant steel spiders. It shall be dynamically balanced, and shall discharge air upwards and horizontally.

D. Compressor:

1. Fully hermetic type with internal and external vibration isolation.
2. All reciprocating compressors are equipped with crankcase heaters.

E. Coils:

1. Indoor and outdoor coils shall have aluminum-plate fins mechanically bonded to seamless copper tubes with all joints brazed.
2. Tube sheet openings shall be belled to prevent tube wear.

F. Refrigerant Components:

1. Fixed orifice metering device feed system
2. Accumulator

G. Controls and Safeties:

1. Unit Controls:
   a. Unit shall be complete with self-contained low-voltage control circuit.
   b. Unit shall incorporate an outdoor-coil defrost system to prevent excessive frost accumulation during heating duty, and shall be controlled as follows:
      1) Defrost shall be initiated on the basis of time and coil temperature.
      2) A 30/50/90 minute timer shall activate defrost cycle only if coil temperature is low enough to indicate a heavy frost condition.
      3) Defrost cycle shall terminate when defrost thermostat is satisfied or shall have a positive termination time of 10 minutes.
2. Safeties:
   a. Compressor, overtemperature, overcurrent.

H. Operating Characteristics:

1. Unit shall be capable of starting and running at 115 F ambient outdoor temperature per maximum load criteria of ARI Standard 240-89.
2. Compressor with standard controls shall be capable of operation down to 40 F ambient outdoor temperature in cooling duty.
3. Compressor shall be capable of operation in heating duty down to –20 F ambient outdoor-air temperature.
4. Unit shall be capable of simultaneous heating duty and defrost cycle operation when using electric heaters indicated in Section K, Special Features.
5. Compressors will be prevented from restarting for a minimum of 5 minutes after shutdown.

I. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location.

J. Motors:
   1. Compressor motors shall be of the refrigerant-cooled type with line break thermal and current overload protection.
   2. All fan motors shall have permanently lubricated bearings and inherent automatic-reset thermal overload protection.
   3. Outdoor-fan motor shall be totally enclosed.

K. Special Features:
   1. Electric Resistance Heaters:
      a. Open-wire nichrome elements with all necessary safety and operating controls.
      b. Heaters are UL listed as indicated on basic unit informative plate.
      c. Each heater assembly shall include the following safety features:
         1) Automatic-reset switches.
         2) Heat limiters for primary and secondary, overcurrent, and thermal protection.
      d. Available with power single-point connections.
   2. Outdoor Thermostat Kit:

      Thermostat allows for staging of electric heaters based on outdoor-air temperature.
   3. Thermostat and Subbase:

      Provides staged cooling and heating automatic (or manual) changeover, fan control.
   4. Electronic Programmable Thermostat:

      Thermostat provides 2-stage heating and 2-stage cooling control with remote communication ability.
   5. High- and Low-Pressure Switches:

      Protect the compressor against improper refrigerant pressures.
   6. Low-Ambient Kit:

      Permits cooling operation at outdoor temperatures as low as 0° F.
   7. Factory-Assembled Roof Curb:

      Provides one-piece support for downflow applications.
   8. Manual Outdoor-Air Damper:

      Provides for minimum outdoor air and is manually adjustable.
   9. Filter Rack:

      Provides internal filtering performance.
   10. Duct Cover Kit:

      Covers horizontal ducts after unit has been converted to downflow discharge.
   11. Rectangular Duct Connection Kit:

      Allows easy conversion from round to rectangular ducts.
   12. Base Rail:

      Provides holes for rigging and handling as well as an elevated base for horizontal applications.
   13. Downflow Option:

      Provides for easy vertical ductwork connections.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.